

ORIGINAL

UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF NEW YORK

JUDGE SWEET

TOUCHTUNES MUSIC CORP.,

Plaintiff,

against

ROWE INTERNATIONAL CORP.,  
ARACHNID, INC.,  
AMI ENTERTAINMENT, INC. and  
MERIT INDUSTRIES, INC. d/b/a/ MERIT  
ENTERTAINMENT,

Defendants.

07 07 CV 11450

**COMPLAINT FOR PATENT  
INFRINGEMENT AND FOR  
DECLARATORY RELIEF**

JURY TRIAL DEMANDED

Plaintiff TOUCHTUNES MUSIC CORP. ("TouchTunes"), by and through its undersigned attorneys, alleges as follows:

**THE PARTIES**

1. Plaintiff TouchTunes is a corporation existing under the laws of the State of Delaware, with a principal place of business located at 3 Commerce Place, 4<sup>th</sup> Floor, Nun's Island (Montreal), Quebec H3E 1H7, Canada and a corporate headquarters at 740 Broadway, 11<sup>th</sup> Floor, Suite 1102, New York, New York 10003.

2. On information and belief, defendant ROWE INTERNATIONAL CORP. ("Rowe") is a corporation existing under the laws of the State of Delaware, having a place of business at 1500 Union Avenue S.E., Grand Rapids, Michigan 49507.

3. On information and belief, defendant ARACHNID, INC. ("Arachnid") is a corporation existing under the laws of the State of Ohio, having a place of business at 6212 Material Ave., Loves Park, Illinois 61111.

4. On information and belief, defendant AMI ENTERTAINMENT, INC. ("AMI") is a corporation organized and existing under the laws of the State of Delaware,

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having a place of business at 1500 Union Avenue, S.E., Grand Rapids, Michigan 49507. AMI is a wholly-owned subsidiary of Rowe.

5. On information and belief, defendant MERIT INDUSTRIES, INC. d/b/a MERIT ENTERTAINMENT (“Merit”) is a corporation existing under the laws of the State of Delaware, having a place of business at 2525 State Road, Bensalem, Pennsylvania 19020.

### **JURISDICTION AND VENUE**

6. This Court has subject matter jurisdiction over this patent action pursuant to 28 U.S.C. §§ 1331, 1338, 2201 and 2202. Actual, substantial and continuing justiciable controversies exist between TouchTunes and Rowe and between TouchTunes and Arachnid that require a declaration of rights by this Court.

7. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391 and 1400.

8. Rowe makes, uses, sells, offers for sale and/or imports into the United States, including in this District and in the State of New York, downloading jukeboxes and/or systems employing downloading jukeboxes. A large percentage of Rowe’s downloading jukeboxes are located in the State of New York and in this District. Rowe is registered to do business in the State of New York and regularly conducts business in the State of New York and in this District. Rowe has New York-based distributors for its products for the purpose of distributing its products in the State of New York and in this District. Rowe regularly services and manages its downloading jukeboxes located in the State of New York and this District either directly or in conjunction with AMI. Rowe has purposefully availed itself of this Court’s jurisdiction by, *inter alia*, committing and continuing to commit acts of patent infringement in this District and the State of New York, as well as through its continuous and systematic contacts with the State of New York and this District. Furthermore, Rowe has purposefully made contacts with this District, by, *inter alia*, maintaining its threats to enforce U.S. Patent Nos. 5,930,765;

6,598,230; 6,970,834; 6,397,189; 6,381,575; 6,191,780; and 5,848,398 against TouchTunes, which is headquartered in this District.

9. Arachnid manufactures and sells a variety of electronic game machines and related equipment, including various electronic dart game machines, many of which are located in this District and in the State of New York. Arachnid has a New York-based distributor for its products for the purpose of distributing its products in the State of New York and in this District. Arachnid also regularly sponsors and/or promotes a variety of events, such as dart tournaments, relating to its game machines in this District and in the State of New York. Arachnid has also licensed numerous patents relating to jukebox technology to Rowe so that Arachnid's patented technology can be incorporated into Rowe's downloading jukeboxes, including the downloading jukeboxes accused of infringement in this action and located in this District and in the State of New York. On information and belief, Rowe is required under a contract between Rowe and Arachnid to use its best efforts to sell its downloading jukeboxes using Arachnid's technology, including the downloading jukeboxes accused of infringement in this action and located in this District and in the State of New York, and Arachnid receives financial compensation for such sales. As a result, Arachnid and Rowe have a collusive relationship with respect to the distribution and sale of Rowe's downloading jukeboxes accused of infringement. Arachnid has purposefully availed itself of this Court's jurisdiction through, *inter alia*, its continuous and systematic contacts with the State of New York and this District by virtue of its product sales and business dealings with persons and/or entities located in the State of New York and in this District. Furthermore, Arachnid has purposefully made contacts with this District by, *inter alia*, maintaining threats to enforce U.S. Patent Nos. 5,930,765; 6,598,230; 6,970,834; 6,397,189; 6,381,575; 6,191,780; and 5,848,398 against TouchTunes, which is headquartered in this District.

10. AMI owns and operates a broadband network, called the “AMI Entertainment Network,” which provides digital music content and Web-based management services for Rowe’s downloading jukeboxes, as well as provides services in connection with the operation of Merit’s gaming products designed for use with Rowe’s downloading jukeboxes. AMI’s network delivers audio and video content and jukebox management services to Rowe’s downloading jukeboxes, including the downloading jukeboxes accused of infringement in this action and located in this District and in the State of New York, and provides various services to Merit’s gaming products accused of infringement in this action. In addition, AMI has entered into licensing agreements with numerous New York entities including, for example, several major record labels and music publishers located in this District, and routinely conducts ongoing business with these various New York entities. On information and belief, AMI maintained, either alone or in connection with Rowe, a music and music publishing licensing office in this District for the purpose of obtaining licenses for AMI with major record labels, independent recording labels, ASCAP, BMI, SESAC, the Harry Fox Agency, the five major music publishing groups, and hundreds of music publishers and recording artists, many of which are located in this District. All of these various licenses were obtained in connection with AMI’s network and in order to supply content to Rowe’s downloading jukeboxes. AMI has purposefully availed itself of this Court’s jurisdiction by, *inter alia*, committing and continuing to commit acts of patent infringement in this District, as well as in the State of New York. AMI has further purposefully availed itself of this Court’s jurisdiction through, *inter alia*, its continuous and systematic contacts with the State of New York and with this District by virtue of its ongoing operation of the AMI network to deliver content and/or services to Rowe’s downloading jukeboxes and Merit’s gaming products located in this District and in the State of New York and by its continuous business dealings with the various New York entities identified herein.

11. Merit makes, uses, sells, offers for sale and/or imports into the United States, including this District, gaming products, including products designed to operate in conjunction with Rowe's downloading jukeboxes and/or systems employing downloading jukeboxes. Merit has New York-based distributors for its products for the purpose of distributing its products in the State of New York and in this District. A large percentage of Merit's gaming devices are located in the State of New York and in this District. Merit also regularly sponsors and/or promotes a variety of events, such as gaming tournaments, relating to its game machines in this District and in the State of New York. Merit also uses the AMI network in connection with servicing and/or operation of its gaming products. On information and belief, Merit and Rowe have a collusive relationship, either by written contract or otherwise, with respect to the distribution, sale and operation and Rowe's downloading jukeboxes and Merit's gaming products designed for use therewith. On information and belief, Rowe and Merit are owned by the same parent company, Harbour Group Ltd. As a result of various contracts, agreements and/or licenses between two or more of Rowe, Arachnid, AMI and Merit relating the subject matter of this action, and the close corporate and/or business relationships between Rowe, Arachnid, AMI and Merit, all of the Defendants have a collusive relationship with respect to the activities complained of herein and in connection with all of the claims for relief set forth herein. Merit has purposefully availed itself of this Court's jurisdiction by committing and continuing to commit acts of patent infringement in this District and in the State of New York, as well through its continuous and systematic contacts with this District and the State of New York as described herein. In addition, Merit has consented to jurisdiction in the District by virtue of a Joint Development Agreement and Marketing Agreement ("JDA") that it entered into in July 2002 with TouchTunes as to any issues relating to the JDA. Merit has previously relied on the JDA in connection with an alleged claim of ownership interest it made against TouchTunes' U.S. Patent No. 6,755,744, which is asserted against Merit in

this action. As a result, issues regarding this JDA have now arisen or will arise in this action. The JDA is to be construed under and controlled by the laws of the State of New York.

#### **TOUCHTUNES' ASSERTED PATENTS-IN-SUIT**

12. On October 23, 2001, United States Patent No. 6,308,204 (“the ‘204 patent”), entitled “Method of Communications for an Intelligent Digital Audiovisual Playback System,” was duly and legally issued by the United States Patent and Trademark Office (“PTO”). A true and correct copy of the ‘204 patent is attached hereto as Exhibit A.

13. TouchTunes has been and remains the owner by assignment of the entire right, title, and interest in the ‘204 patent, including, *inter alia*, the right to sue for past infringement of the ‘204 patent.

14. On June 10, 2003, United States Patent No. 6,578,051 (“the ‘051 patent”), entitled “Device and Process for Remote Management of a Network of Audiovisual Information Reproduction Systems,” was duly and legally issued by the PTO. A true and correct copy of the ‘051 patent is attached hereto as Exhibit B.

15. TouchTunes has been and remains the owner by assignment of the entire right, title, and interest in the ‘051 patent, including, *inter alia*, the right to sue for past and present infringement of the ‘051 patent.

16. On June 29, 2004, United States Patent No. 6,755,744 (“the ‘744 patent”), entitled “Communication Device and Method Between an Audiovisual Information Playback System and an Electronic Game Machine,” was duly and legally issued by the PTO. A true and correct copy of the ‘744 patent is attached hereto as Exhibit C.

17. TouchTunes has been and remains the owner by assignment of the entire right, title, and interest in the ‘744 patent, including, *inter alia*, the right to sue for past and present infringement of the ‘744 patent.

18. Rowe, Merit and AMI had prior notice of TouchTunes patents and the infringement thereof either by actual and/or constructive notice in compliance with 35 U.S.C. § 287.

**BACKGROUND FOR TOUCHTUNES' DECLARATORY RELIEF**

19. United States Patent No. 5,930,765 ("the '765 patent"), entitled "Downloading Method for Songs and Advertisements," was filed on November 21, 1997 and issued on July 27, 1999. The '765 patent names John R. Martin as its inventor. A true and correct copy of the '765 patent is attached hereto as Exhibit D.

20. United States Patent No. 6,598,230 ("the '230 patent"), entitled "Multimedia Box Network," was filed on February 25, 1999 and issued on July 22, 2003. The '230 patent names Karsten Ballhorn as its inventor. A true and correct copy of the '230 patent is attached hereto as Exhibit E.

21. United States Patent No. 6,970,834 ("the '834 patent"), entitled "Advertisement Downloading Computer Jukebox," was filed on November 20, 2002 and issued on November 25, 2005. The '834 patent names as inventors John R. Martin, Michael L. Tillery and Samuel N. Zammuto. A true and correct copy of the '834 patent is attached hereto as Exhibit F.

22. United States Patent No. 6,397,189 ("the '189 patent"), entitled "Computer Jukebox and Jukebox Network," was filed on May 12, 1998 and issued on May 28, 2002. The '189 patent names as inventors John R. Martin, Michael L. Tillery, and Samuel N. Zammuto. A true and correct copy of the '189 patent is attached hereto as Exhibit G.

23. United States Patent No. 6,381,575 (“the ‘575 patent”), entitled “Computer Jukebox and Computer Jukebox Management System,” was filed on February 11, 2000 and issued on April 30, 2002. The ‘575 patent names as inventors John R. Martin and Michael L. Tillery. A true and correct copy of the ‘575 patent is attached hereto as Exhibit H.

24. United States Patent No. 6,191,780 (“the ‘780 patent”), entitled “Customizable Multimedia Segment Structures,” was filed on March 25, 1998 and issued on February 20, 2001. The ‘780 patent names as inventors John R. Martin and Charles D. Rentmeesters. A true and correct copy of the ‘780 patent is attached hereto as Exhibit I.

25. United States Patent No. 5,848,398 (“the ‘398 patent”), entitled “System for Managing a Plurality of Computer Jukeboxes,” was filed on April 25, 1996 and issued on December 8, 1998. The ‘398 patent names as inventors John R. Martin, Michael L. Tillery and Samuel N. Zammuto. A true and correct copy of the ‘398 patent is attached hereto as Exhibit J.

26. Upon information and belief, Arachnid, Inc. is the owner of the ‘765, ‘834, ‘189, ‘575, ‘780, and ‘398 patents by assignment.

27. Upon information and belief, Rowe is the owner of the ‘230 patent and a licensee of the ‘765, ‘834, ‘189, ‘575, ‘780, and ‘398 patents.

28. Rowe and Arachnid have advised TouchTunes that they intend to enforce any applicable claims of the ‘765, ‘230, ‘834, ‘189, ‘575, ‘780, and ‘398 patents against TouchTunes upon completion of the presently pending lawsuit captioned *Rowe*



*International Corp. and Arachnid, Inc. v. Ecast, Inc. et al.*, Case No. 1:06-cv-02703

(N.D. Ill.). That lawsuit is presently in an advanced stage of litigation.

29. TouchTunes denies that it has infringed any valid claim of the ‘765, ‘230, ‘834, ‘189, ‘575, ‘780, and ‘398 patents.

30. Based on Rowe and Arachnid’s assertions of patent infringement by TouchTunes, an actual, substantial and continuing justiciable controversy exists between TouchTunes and Rowe and between TouchTunes and Arachnid that requires a declaration of rights by this Court.

### **First Claim For Relief**

#### **INFRINGEMENT OF U.S. PATENT NO. 6,308,204**

31. TouchTunes incorporates by this reference all paragraphs of this Complaint for Patent Infringement and for Declaratory Relief (“Complaint”), as though fully set forth herein.

32. Rowe has infringed and is infringing (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) one or more claims of the ‘204 patent by making, using, importing, offering for sale, and/or selling downloading jukeboxes and/or products or systems employing downloading jukeboxes covered by one or more claims of the ‘204 patent.

33. AMI has infringed and is infringing (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) one or more claims of the ‘204 patent by making, using and operating the AMI network for use in connection with Rowe’s downloading jukeboxes and/or products or systems employing downloading jukeboxes covered by one or more claims of the ‘204 patent.

34. On information and belief, Rowe's infringement of the '204 patent has been and continues to be deliberate and willful, and such infringement will continue unless Rowe is preliminarily and permanently enjoined by this Court.

35. On information and belief, AMI's infringement of the '204 patent has been and continues to be deliberate and willful, and such infringement will continue unless Rowe is preliminarily and permanently enjoined by this Court.

36. As a consequence of Rowe's infringement of the '204 patent, TouchTunes has been damaged and will continue to sustain damages by such acts in an amount to be determined at trial and, unless Rowe's infringement is restrained by the Court, will continue to suffer irreparable loss and injury.

37. As a consequence of AMI's infringement of the '204 patent, TouchTunes has been damaged and will continue to sustain damages by such acts in an amount to be determined at trial and, unless AMI's infringement is restrained by the Court, will continue to suffer irreparable loss and injury.

38. As a result of the activities described herein, Rowe and AMI are jointly and severally liable for the damages sustained by TouchTunes for infringement of the '204 patent.

### **Second Claim For Relief**

#### **INFRINGEMENT OF U.S. PATENT NO. 6,578,051**

39. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

40. Rowe has infringed and is infringing (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) one or more claims of the '051 patent by making, using, importing, offering for sale, and/or selling downloading jukeboxes and/or products or systems employing downloading jukeboxes covered by one or more claims of the '051 patent.

41. AMI has infringed (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) one or more claims of the ‘051 patent by making, using and operating the AMI network for use in connection with Rowe’s downloading jukeboxes and/or products or systems employing downloading jukeboxes covered by one or more claims of the ‘051 patent.

42. On information and belief, Rowe’s infringement of the ‘051 patent has been and continues to be deliberate and willful, and such infringement will continue unless Rowe is preliminarily and permanently enjoined by this Court.

43. On information and belief, AMI’s infringement of the ‘051 patent has been and continues to be deliberate and willful, and such infringement will continue unless AMI is preliminarily and permanently enjoined by this Court.

44. As a consequence of Rowe’s infringement of the ‘051 patent, TouchTunes has been damaged and will continue to sustain damages by such acts in an amount to be determined at trial and, unless Rowe’s infringement is restrained by the Court, will continue to suffer irreparable loss and injury.

45. As a consequence of AMI’s infringement of the ‘051 patent, TouchTunes has been damaged and will continue to sustain damages by such acts in an amount to be determined at trial and, unless AMI’s infringement is restrained by the Court, will continue to suffer irreparable loss and injury.

46. As a result of the activities described herein, Rowe and AMI are jointly and severally liable for the damages sustained by TouchTunes for infringement of the ‘051 patent.

### **Third Claim For Relief**

#### **INFRINGEMENT OF U.S. PATENT NO. 6,755,744**

47. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

48. Rowe has infringed and is infringing (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) one or more claims of the ‘744 patent by making, using, importing, offering for sale, and/or selling downloading jukeboxes and/or products or systems employing downloading jukeboxes covered by one or more claims of the ‘744 patent.

49. AMI has infringed and is infringing (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) one or more claims of the ‘744 patent by making, using and operating the AMI network for use in connection with Rowe’s downloading jukeboxes and/or products or systems employing downloading jukeboxes covered by one or more claims of the ‘744 patent, as well as by making, using and operating the AMI network for use in connection with Merit’s gaming products covered by one or more claims of the ‘744 patent

50. Merit has infringed and is infringing (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) one or more claims of the ‘744 patent by making, using, importing, offering for sale, and/or selling gaming products for use with Rowe’s downloading jukeboxes and/or products or systems employing downloading jukeboxes covered by one or more claims of the ‘744 patent.

51. On information and belief, Rowe’s infringement of the ‘744 patent has been and continues to be deliberate and willful, and such infringement will continue unless Rowe is preliminarily and permanently enjoined by this Court.

52. On information and belief, AMI’s infringement of the ‘744 patent has been and continues to be deliberate and willful, and such infringement will continue unless AMI is preliminarily and permanently enjoined by this Court.

53. On information and belief, Merit’s infringement of the ‘744 patent has been and continues to be deliberate and willful, and such infringement will continue unless Merit is preliminarily and permanently enjoined by this Court.

54. As a consequence of Rowe's infringement of the '744 patent, TouchTunes has been damaged and will continue to sustain damages by such acts in an amount to be determined at trial and, unless Rowe's infringement is restrained by the Court, will continue to suffer irreparable loss and injury.

55. As a consequence of AMI's infringement of the '744 patent, TouchTunes has been damaged and will continue to sustain damages by such acts in an amount to be determined at trial and, unless AMI's infringement is restrained by the Court, will continue to suffer irreparable loss and injury.

56. As a consequence of Merit's infringement of the '744 patent, TouchTunes has been damaged and will continue to sustain damages by such acts in an amount to be determined at trial and, unless Merit's infringement is restrained by the Court, will continue to suffer irreparable loss and injury.

57. As a result of the activities described herein, Rowe, AMI and Merit are jointly and severally liable for the damages sustained by TouchTunes for infringement of the '744 patent.

**Fourth Claim For Relief**  
**DECLARATORY JUDGMENT – NON-INFRINGEMENT OF THE '765 PATENT**

58. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

59. This is an action for declaratory judgment of non-infringement of any and all valid claims of the '765 patent.

60. TouchTunes has an objectively reasonable apprehension that Rowe and/or Arachnid will bring a patent infringement action on the '765 patent against TouchTunes.

61. Upon information and belief, Arachnid is the assignee of all rights in and to the '765 patent.

62. Upon information and belief, Rowe is the exclusive licensee of the ‘765 patent.

63. Rowe and Arachnid have alleged and continue to allege that TouchTunes has infringed and is infringing the ‘765 patent.

64. TouchTunes denies Rowe and Arachnid’s allegations with respect to infringement by TouchTunes. TouchTunes has not and does not infringe (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) any claim of the ‘765 patent.

65. Accordingly, there exists an actual, justiciable controversy between TouchTunes and Rowe and between TouchTunes and Arachnid relating to whether TouchTunes infringes the claims of the ‘765 patent.

66. TouchTunes desires and requests a judicial declaration of TouchTunes’ non-infringement of the ‘765 patent.

**Fifth Claim For Relief**  
**DECLARATORY JUDGMENT – NON-INFRINGEMENT OF THE ‘230 PATENT**

67. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

68. This is an action for declaratory judgment of non-infringement of any and all valid claims of the ‘230 patent.

69. TouchTunes has an objectively reasonable apprehension that Rowe and/or Arachnid will bring a patent infringement action on the ‘230 patent against TouchTunes.

70. Upon information and belief, Arachnid has certain rights under the ‘230 patent.

71. Upon information and belief, Rowe is the owner of the ‘230 patent.

72. Rowe and Arachnid have alleged and continue to allege that TouchTunes has infringed and is infringing the '230 patent.

73. TouchTunes denies Rowe and Arachnid's allegations with respect to infringement by TouchTunes. TouchTunes has not and does not infringe (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) any claim of the '230 patent.

74. Accordingly, there exists an actual, justiciable controversy between TouchTunes and Rowe and between TouchTunes and Arachnid relating to whether TouchTunes infringes the claims of the '230 patent.

75. TouchTunes desires and requests a judicial declaration of TouchTunes' non-infringement of the '230 patent.

**Sixth Claim For Relief**  
**DECLARATORY JUDGMENT – NON-INFRINGEMENT OF THE '834 PATENT**

76. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

77. This is an action for declaratory judgment of non-infringement of any and all valid claims of the '834 patent.

78. TouchTunes has an objectively reasonable apprehension that Rowe and/or Arachnid will bring a patent infringement action on the '834 patent against TouchTunes.

79. Upon information and belief, Arachnid is the assignee of all rights in and to the '834 patent.

80. Upon information and belief, Rowe is the exclusive licensee of the '834 patent.

81. Rowe and Arachnid have alleged and continue to allege that TouchTunes has infringed and is infringing the '834 patent.

82. TouchTunes denies Rowe and Arachnid's allegations with respect to infringement by TouchTunes. TouchTunes has not and does not infringe (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) any claim of the '834 patent.

83. Accordingly, there exists an actual, justiciable controversy between TouchTunes and Rowe and between TouchTunes and Arachnid relating to whether TouchTunes infringes the claims of the '834 patent.

84. TouchTunes desires and requests a judicial declaration of TouchTunes' non-infringement of the '834 patent.

**Seventh Claim For Relief**  
**DECLARATORY JUDGMENT – NON-INFRINGEMENT OF THE '189 PATENT**

85. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

86. This is an action for declaratory judgment of non-infringement of any and all valid claims of the '189 patent.

87. TouchTunes has an objectively reasonable apprehension that Rowe and/or Arachnid will bring a patent infringement action on the '189 patent against TouchTunes.

88. Upon information and belief, Arachnid is the assignee of all rights in and to the '189 patent.

89. Upon information and belief, Rowe is the exclusive licensee of the '189 patent.



90. Rowe and Arachnid have alleged and continue to allege that TouchTunes has infringed and is infringing the '189 patent.

91. TouchTunes denies Rowe and Arachnid's allegations with respect to infringement by TouchTunes. TouchTunes has not and does not infringe (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) any claim of the '189 patent.

92. Accordingly, there exists an actual, justiciable controversy between TouchTunes and Rowe and between TouchTunes and Arachnid relating to whether TouchTunes infringes the claims of the '189 patent.

93. TouchTunes desires and request a judicial declaration of TouchTunes' non-infringement of the '189 patent.

**Eighth Claim For Relief**  
**DECLARATORY JUDGMENT – NON-INFRINGEMENT OF THE '575 PATENT**

94. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

95. This is an action for declaratory judgment of non-infringement of any and all valid claims of the '575 patent.

96. TouchTunes has an objectively reasonable apprehension that Rowe and/or Arachnid will bring a patent infringement action on the '575 patent against TouchTunes.

97. Upon information and belief, Arachnid is the assignee of all rights in and to the '575 patent.

98. Upon information and belief, Rowe is the exclusive licensee of the '575 patent.

99. Rowe and Arachnid have alleged and continue to allege that TouchTunes has infringed and is infringing the '575 patent.

100. TouchTunes denies Rowe and Arachnid's allegations with respect to infringement by TouchTunes. TouchTunes has not and does not infringe (directly, contributorily and/or by active inducement– literally and/or under the doctrine of equivalents) any claim of the '575 patent.

101. Accordingly, there exists an actual, justiciable controversy between TouchTunes and Rowe and between TouchTunes and Arachnid relating to whether TouchTunes infringes the claims of the '575 patent.

102. TouchTunes desires and requests a judicial declaration of TouchTunes' non-infringement of the '575 patent.

**Ninth Claim For Relief**  
**DECLARATORY JUDGMENT – NON-INFRINGEMENT OF THE '780 PATENT**

103. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

104. This is an action for declaratory judgment of non-infringement of any and all valid claims of the '780 patent.

105. TouchTunes has an objectively reasonable apprehension that Rowe and/or Arachnid will bring a patent infringement action on the '780 patent against TouchTunes.

106. Upon information and belief, Arachnid is the assignee of all rights in and to the '780 patent.

107. Upon information and belief, Rowe is the exclusive licensee of the '780 patent.

108. Rowe and Arachnid have alleged and continue to allege that TouchTunes has infringed and is infringing the '780 patent.

109. TouchTunes denies Rowe and Arachnid's allegations with respect to infringement by TouchTunes. TouchTunes has not and does not infringe (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) any claim of the '780 patent.

110. Accordingly, there exists an actual, justiciable controversy between TouchTunes and Rowe and between TouchTunes and Arachnid relating to whether TouchTunes infringes the claims of the '780 patent.

111. TouchTunes desires and requests a judicial declaration of TouchTunes' non-infringement of the '780 patent.

**Tenth Claim For Relief**  
**DECLARATORY JUDGMENT – NON-INFRINGEMENT OF THE '398 PATENT**

112. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

113. This is an action for declaratory judgment of non-infringement of any and all valid claims of the '398 patent.

114. TouchTunes has an objectively reasonable apprehension that Rowe and/or Arachnid will bring a patent infringement action on the '398 patent against TouchTunes.

115. Upon information and belief, Arachnid is the assignee of all rights in and to the '398 patent.

116. Upon information and belief, Rowe is the exclusive licensee of the '398 patent.

117. Rowe and Arachnid have alleged and continue to allege that TouchTunes has infringed and is infringing the '398 patent.

118. TouchTunes denies Rowe and Arachnid's allegations with respect to infringement by TouchTunes. TouchTunes has not and does not infringe (directly, contributorily and/or by active inducement– literally and/or under the doctrine of equivalents) any claim of the '398 patent.

119. Accordingly, there exists an actual, justiciable controversy between TouchTunes and Rowe and between TouchTunes and Arachnid relating to whether TouchTunes infringes the claims of the '398 patent.

120. TouchTunes desires and requests a judicial declaration of TouchTunes' non-infringement of the '398 patent.

**Eleventh Claim For Relief**  
**DECLARATORY JUDGMENT – INVALIDITY OF THE '765 PATENT**

121. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

122. This is an action for declaratory judgment of invalidity of any and all claims of the '765 patent.

123. TouchTunes has an objectively reasonable apprehension that Rowe and/or Arachnid will bring a patent infringement action on the '765 patent against TouchTunes.

124. The claims of the '765 patent are invalid because they fail to comply with the conditions and requirements for patentability set forth in 35 U.S.C. § 1 et seq., including but not limited to 35 U.S.C. §§ 101, 102, 103, and/or 112.

125. Accordingly, there exists an actual, justiciable controversy between TouchTunes and Rowe and between TouchTunes and Arachnid relating to whether the claims of the '765 patent are invalid.

126. TouchTunes desires and requests a judicial declaration that the claims of the '765 patent are invalid.

**Twelfth Claim For Relief**  
**DECLARATORY JUDGMENT – INVALIDITY OF THE '230 PATENT**

127. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

128. This is an action for declaratory judgment of invalidity of any and all claims of the '230 patent.

129. TouchTunes has an objectively reasonable apprehension that Rowe and/or Arachnid will bring a patent infringement action on the '230 patent against TouchTunes.

130. The claims of the '230 patent are invalid because they fail to comply with the conditions and requirements for patentability set forth in 35 U.S.C. § 1 et seq., including but not limited to 35 U.S.C. §§ 101, 102, 103 and/or 112.

131. Accordingly, there exists an actual, justiciable controversy between TouchTunes and Rowe and between TouchTunes and Arachnid relating to whether the claims of the '230 patent are invalid.

132. TouchTunes desires and request a judicial declaration that the claims of the '230 patent are invalid.

**Thirteenth Claim For Relief**  
**DECLARATORY JUDGMENT – INVALIDITY OF THE '834 PATENT**

133. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

134. This is an action for declaratory judgment of invalidity of any and all claims of the '834 patent.

135. TouchTunes has an objectively reasonable apprehension that Rowe and/or Arachnid will bring a patent infringement action on the '834 patent against TouchTunes.

136. The claims of the '834 patent are invalid because they fail to comply with the conditions and requirements for patentability set forth in 35 U.S.C. § 1 et seq., including but not limited to 35 U.S.C. §§ 101, 102, 103 and/or 112.

137. Accordingly, there exists an actual, justiciable controversy between TouchTunes and Rowe and between TouchTunes and Arachnid relating to whether the claims of the '834 patent are invalid.

138. TouchTunes desires and requests a judicial declaration that the claims of the '834 patent are invalid.

**Fourteenth Claim For Relief**  
**DECLARATORY JUDGMENT – INVALIDITY OF THE '189 PATENT**

139. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

140. This is an action for declaratory judgment of invalidity of any and all claims of the '189 patent.

141. TouchTunes has an objectively reasonable apprehension that Rowe and/or Arachnid will bring a patent infringement action on the '189 patent against TouchTunes.

142. The claims of the '189 patent are invalid because they fail to comply with the conditions and requirements for patentability set forth in 35 U.S.C. § 1 et seq., including but not limited to 35 U.S.C. §§ 101, 102, 103 and/or 112.

143. Accordingly, there exists an actual, justiciable controversy between TouchTunes and Rowe and between TouchTunes and Arachnid relating to whether the claims of the '189 patent are invalid.

144. TouchTunes desires and requests a judicial declaration that the claims of the '189 patent are invalid.

**Fifteenth Claim For Relief**  
**DECLARATORY JUDGMENT – INVALIDITY OF THE '575 PATENT**

145. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

146. This is an action for declaratory judgment of invalidity of any and all claims of the '575 patent.

147. TouchTunes has an objectively reasonable apprehension that Rowe and/or Arachnid will bring a patent infringement action on the '575 patent against TouchTunes.

148. The claims of the '575 patent are invalid because they fail to comply with the conditions and requirements for patentability set forth in 35 U.S.C. § 1 et seq., including but not limited to 35 U.S.C. §§ 101, 102, 103 and/or 112.

149. Accordingly, there exists an actual, justiciable controversy between TouchTunes and Rowe and between TouchTunes and Arachnid relating to whether the claims of the '575 patent are invalid.

150. TouchTunes desires and requests a judicial declaration that the claims of the '575 patent are invalid.

**Sixteenth Claim For Relief**  
**DECLARATORY JUDGMENT – INVALIDITY OF THE ‘780 PATENT**

151. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

152. This is an action for declaratory judgment of invalidity of any and all claims of the ‘780 patent.

153. TouchTunes has an objectively reasonable apprehension that Rowe and/or Arachnid will bring a patent infringement action on the ‘780 patent against TouchTunes.

154. The claims of the ‘780 patent are invalid because they fail to comply with the conditions and requirements for patentability set forth in 35 U.S.C. § 1 et seq., including but not limited to 35 U.S.C. §§ 101, 102, 103 and/or 112.

155. Accordingly, there exists an actual, justiciable controversy between TouchTunes and Rowe and between TouchTunes and Arachnid relating to whether the claims of the ‘780 patent are invalid.

156. TouchTunes desires and requests a judicial declaration that the claims of the ‘780 patent are invalid.

**Seventeenth Claim For Relief**  
**DECLARATORY JUDGMENT – INVALIDITY OF THE ‘398 PATENT**

157. TouchTunes incorporates by this reference all paragraphs of this Complaint, as though fully set forth herein.

158. This is an action for declaratory judgment of invalidity of any and all claims of the ‘398 patent.

159. TouchTunes has an objectively reasonable apprehension that Rowe and/or Arachnid will bring a patent infringement action on the ‘398 patent against TouchTunes.



160. The claims of the '398 patent are invalid because they fail to comply with the conditions and requirements for patentability set forth in 35 U.S.C. § 1 et seq., including but not limited to 35 U.S.C. §§ 101, 102, 103 and/or 112.

161. Accordingly, there exists an actual, justiciable controversy between TouchTunes and Rowe and between TouchTunes and Arachnid relating to whether the claims of the '398 patent are invalid.

162. TouchTunes desires and requests a judicial declaration that the claims of the '398 patent are invalid.

#### **PRAYER FOR JUDGMENT AND RELIEF**

WHEREFORE, TouchTunes requests judgment as follows:

- (1) Pursuant to 35 U.S.C. § 271, a determination that Rowe has infringed (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) one or more claims of U.S. Patent Nos. 6,308,204; 6,578,051 and 6,755,744;
- (2) Pursuant to 35 U.S.C. § 271, a determination that AMI has infringed (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) one or more claims of U.S. Patent Nos. 6,308,204; 6,578,051 and 6,755,744;
- (3) Pursuant to 35 U.S.C. § 271, a determination that Merit has infringed (directly, contributorily and/or by active inducement—literally and/or under the doctrine of equivalents) one or more claims of U.S. Patent No. 6,755,744;
- (4) Pursuant to 35 U.S.C. § 283, an order that Rowe and those in privity with Rowe be preliminarily and permanently enjoined from infringing U.S. Patent Nos. 6,308,204; 6,578,051 and 6,755,744;

(5) Pursuant to 35 U.S.C. § 283, an order that AMI and those in privity with AMI be preliminarily and permanently enjoined from infringing U.S. Patent Nos. 6,308,204; 6,578,051 and 6,755,744;

(6) Pursuant to 35 U.S.C. § 283, an order that Merit and those in privity with Merit be preliminarily and permanently enjoined from infringing U.S. Patent No. 6,755,744;

(7) Pursuant to 35 U.S.C. § 284, an award of damages adequate to compensate TouchTunes for Rowe's infringement of U.S. Patent Nos. 6,308,204; 6,578,051 and 6,755,744, but in no event less than a reasonable royalty, together with prejudgment interest, costs and disbursements as fixed by the Court;

(8) Pursuant to 35 U.S.C. § 284, an award of damages adequate to compensate TouchTunes for AMI's infringement of U.S. Patent Nos. 6,308,204; 6,578,051 and 6,755,744, but in no event less than a reasonable royalty, together with prejudgment interest, costs and disbursements as fixed by the Court;

(9) Pursuant to 35 U.S.C. § 284, an award of damages adequate to compensate TouchTunes for Merit's infringement of U.S. Patent No. 6,755,744, but in no event less than a reasonable royalty, together with prejudgment interest, costs and disbursements as fixed by the Court;

(10) Pursuant to 35 U.S.C. § 284, an award increasing damages up to three times the amount found or assessed for infringement of U.S. Patent Nos. 6,308,204; 6,578,051 and 6,755,744 by Rowe due to the willful and deliberate nature of the infringement;

(11) Pursuant to 35 U.S.C. § 284, an award increasing damages up to three times the amount found or assessed for infringement of U.S. Patent Nos. 6,308,204; 6,578,051 and 6,755,744 by AMI due to the willful and deliberate nature of the infringement;

(12) Pursuant to 35 U.S.C. § 284, an award increasing damages up to three times the amount found or assessed for infringement of U.S. Patent No. 6,755,744 by Merit due to the willful and deliberate nature of the infringement;

(13) A judgment declaring that TouchTunes has not infringed and does not infringe in any manner any claim of the '764 patent;

(14) A judgment declaring that TouchTunes has not infringed and does not infringe in any manner any claim of the '230 patent;

(15) A judgment declaring that TouchTunes has not infringed and does not infringe in any manner any claim of the '834 patent;

(16) A judgment declaring that TouchTunes has not infringed and does not infringe in any manner any claim of the '189 patent;

(17) A judgment declaring that TouchTunes has not infringed and does not infringe in any manner any claim of the '575 patent;

(18) A judgment declaring that TouchTunes has not infringed and does not infringe in any manner any claim of the '780 patent;

(19) A judgment declaring that TouchTunes has not infringed and does not infringe in any manner any claim of the '398 patent;

(20) A judgment declaring that each claim of the '765 patent is invalid;

(21) A judgment declaring that each claim of the '230 patent is invalid;

(22) A judgment declaring that each claim of the '834 patent is invalid;

(23) A judgment declaring that each claim of the '189 patent is invalid;

(24) A judgment declaring that each claim of the '575 patent is invalid;

(25) A judgment declaring that each claim of the '780 patent is invalid;

(26) A judgment declaring that each claim of the '398 patent is invalid;

(27) A judgment determining this to be an "exceptional" case within the meaning of 35 U.S.C. § 285, entitling TouchTunes to an award of its reasonable attorneys' fees, expenses, and costs in this action; and

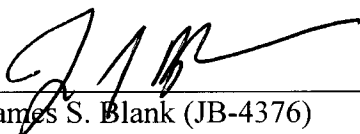
(28) For such other and further relief, in law or in equity, as this Court deems just.

**JURY DEMAND**

TouchTunes demands a trial by jury of all issues triable as of right by a jury in this action.

Dated: December 20, 2007  
New York, New York

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By   
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# **Exhibit A**



US006308204B1

(12) **United States Patent**  
Nathan et al.

(10) Patent No.: **US 6,308,204 B1**  
(45) Date of Patent: **\*Oct. 23, 2001**

(54) **METHOD OF COMMUNICATIONS FOR AN INTELLIGENT DIGITAL AUDIOVISUAL PLAYBACK SYSTEM**

(75) Inventors: **Guy Nathan, Yerres; Tony Mastronardi**, Pierrefonds, both of (CA)

(73) Assignee: **Touchtunes Music Corporation**, Las Vegas, NV (US)

(\*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **08/817,528**

(22) PCT Filed: **Oct. 12, 1995**

(86) PCT No.: **PCT/FR95/01334**

§ 371 Date: **Aug. 5, 1997**

§ 102(e) Date: **Aug. 5, 1997**

(87) PCT Pub. No.: **WO96/12257**

PCT Pub. Date: **Apr. 25, 1996**

(30) **Foreign Application Priority Data**

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Jul. 11, 1995 (FR) ..... 95 08392

(51) Int. Cl.<sup>7</sup> ..... **G06F 15/177**

(52) U.S. Cl. .... **709/221; 709/219; 709/222; 707/204; 713/1; 713/2; 713/100**

(58) Field of Search ..... **709/221, 203, 709/204, 217, 219, 236, 230, 238, 244, 218, 222; 707/204; 714/13, 36, 38; 713/1, 2, 100**

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Primary Examiner—Robert B. Harrell

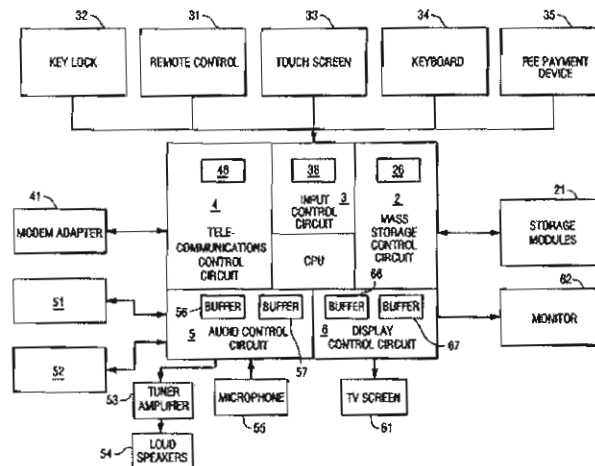
Assistant Examiner—William C. Vaughn, Jr.

(74) Attorney, Agent, or Firm—Nixon and Vanderhye

(57) **ABSTRACT**

Method for communication between a central server and a computerized juke-box which operates in a conference mode, including: sending a header before any transaction, which includes the identity of the destination together, the identity of the emitter, and the size of the packets; responding from the server in the form of a data packet, each packet sent by the server being encoded using the identification code of the juke-box software; and receiving a data packet by the juke-box, which decodes the packet, simultaneously performs a check on the data received by the CRC method and sends an acknowledgment of receipt to the server indicating the accuracy of the information received, to allow it to prepare and send another packet to the juke-box.

**3 Claims, 8 Drawing Sheets**



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Page 2

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Sheet 1 of 8

US 6,308,204 B1

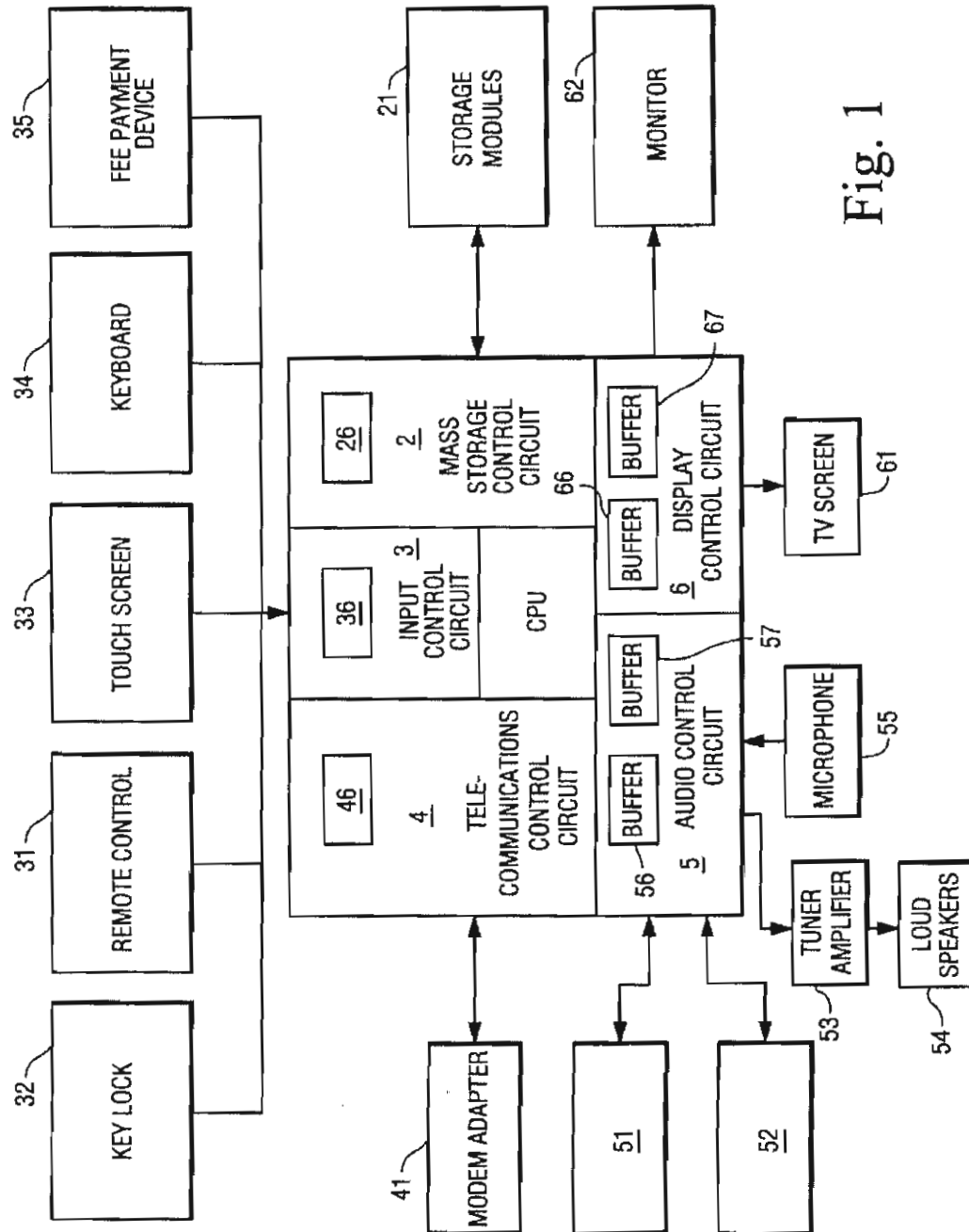


Fig. 1

U.S. Patent

Oct. 23, 2001

Sheet 2 of 8

US 6,308,204 B1

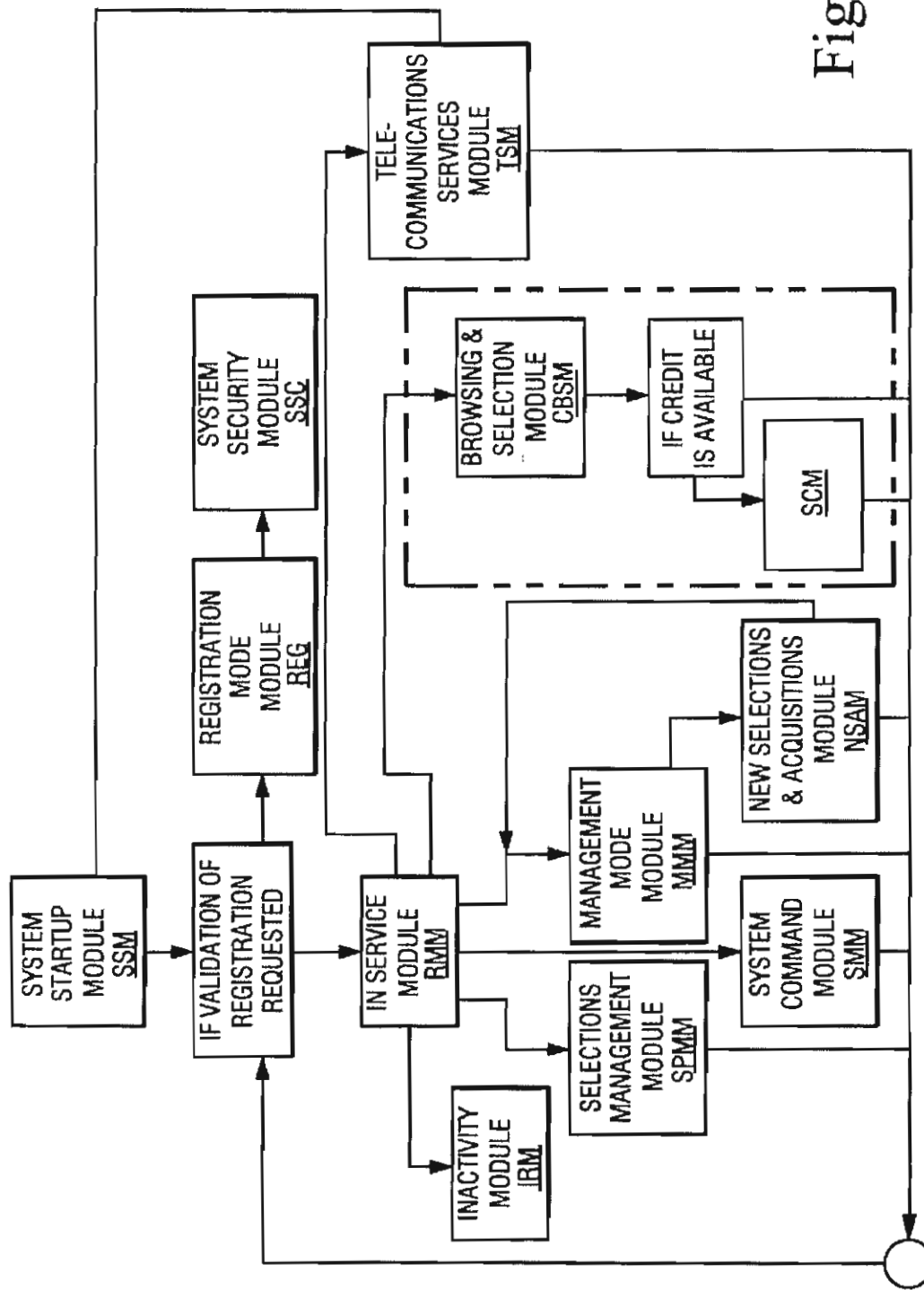


Fig. 2

U.S. Patent

Oct. 23, 2001

Sheet 3 of 8

US 6,308,204 B1

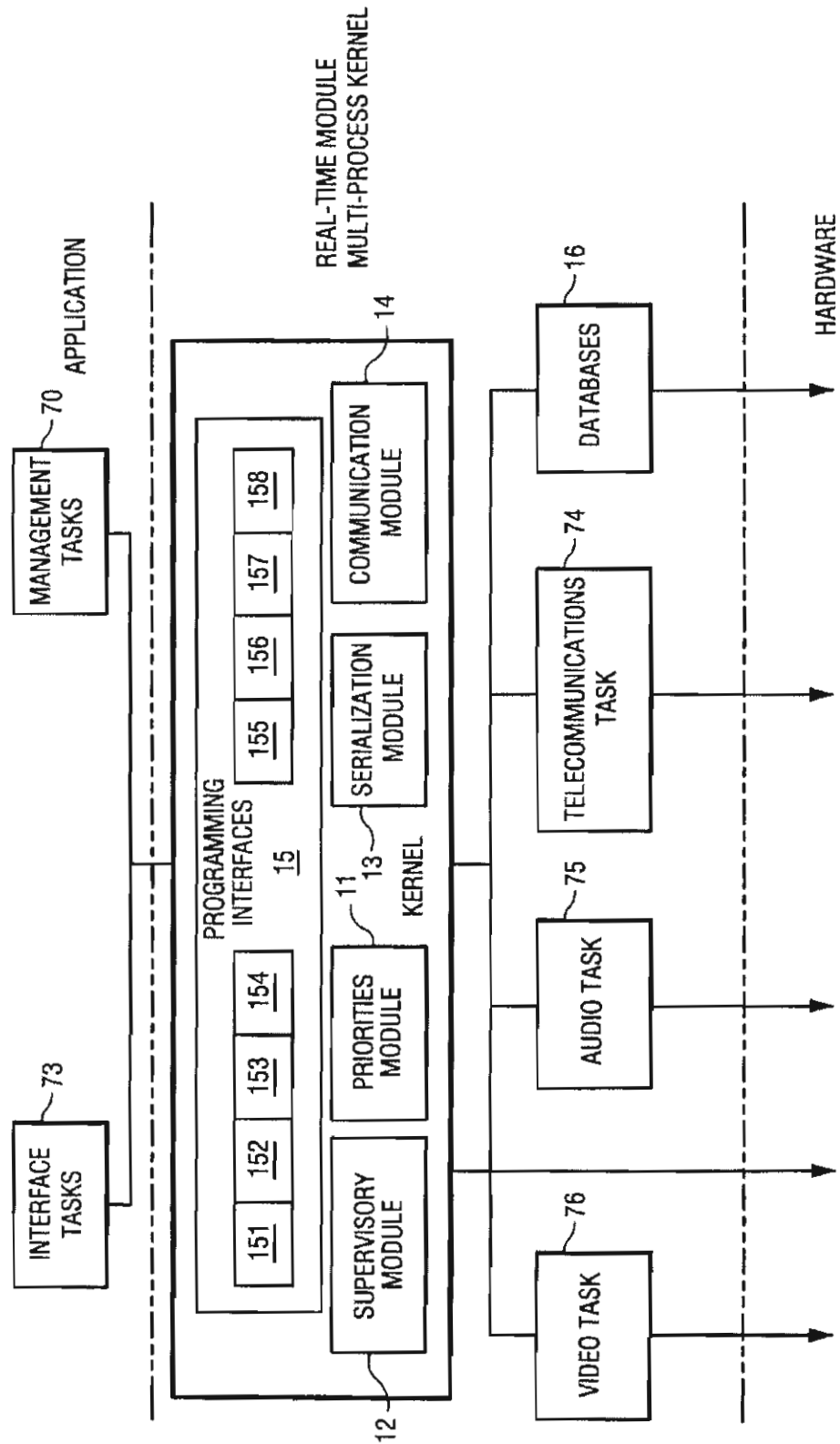
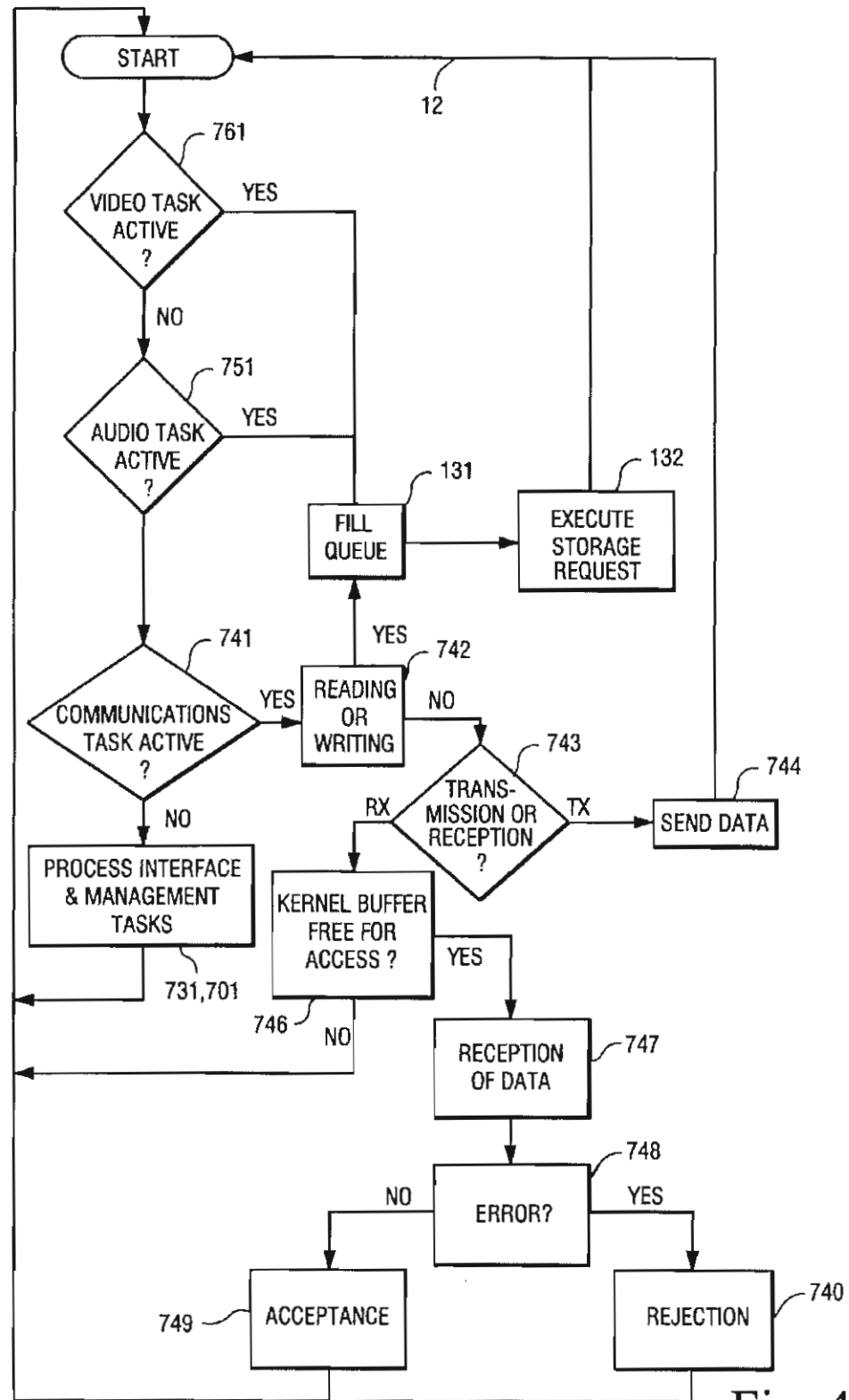


Fig. 3



U.S. Patent

Oct. 23, 2001

Sheet 5 of 8

US 6,308,204 B1

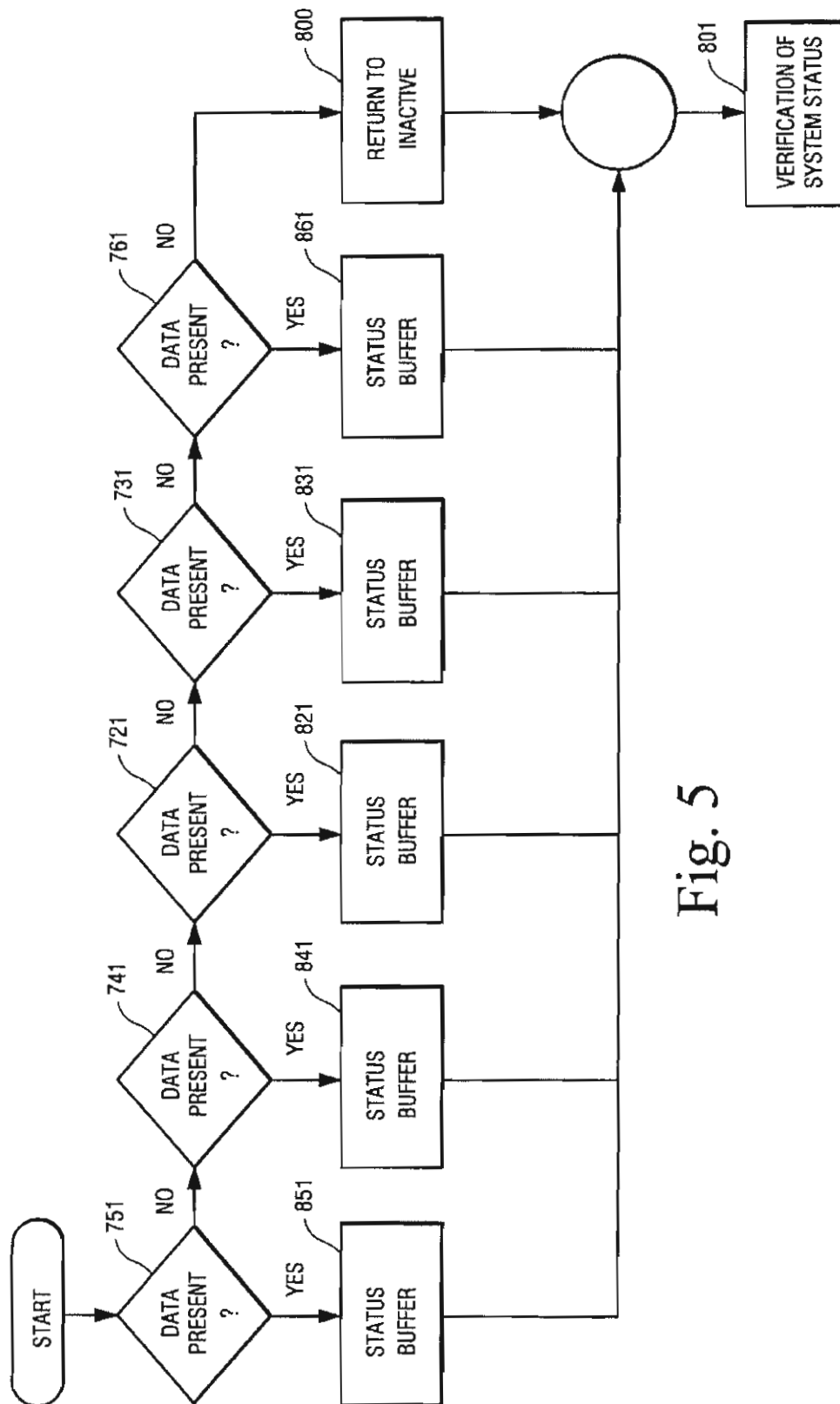


Fig. 5

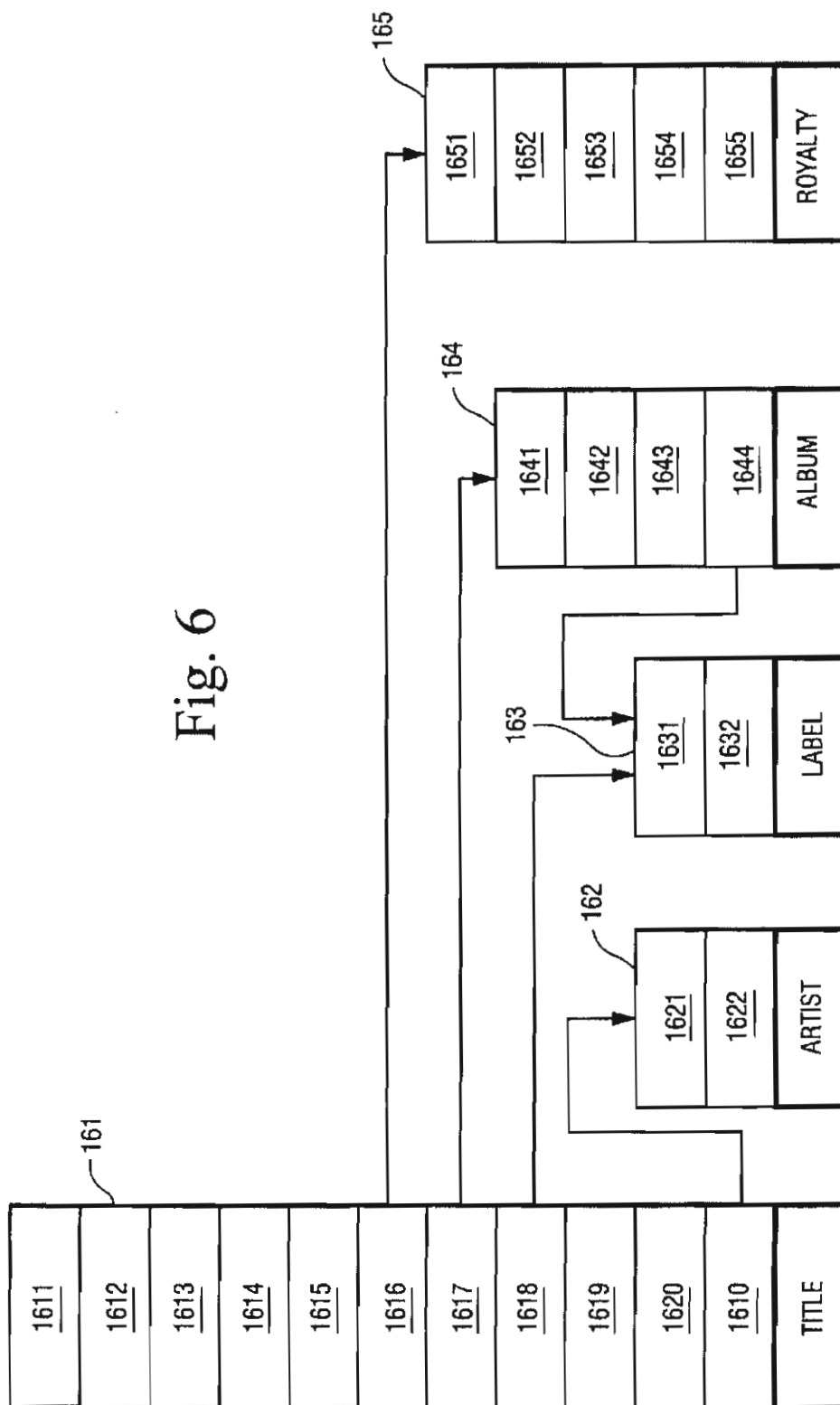
U.S. Patent

Oct. 23, 2001

Sheet 6 of 8

US 6,308,204 B1

Fig. 6



U.S. Patent

Oct. 23, 2001

Sheet 7 of 8

US 6,308,204 B1

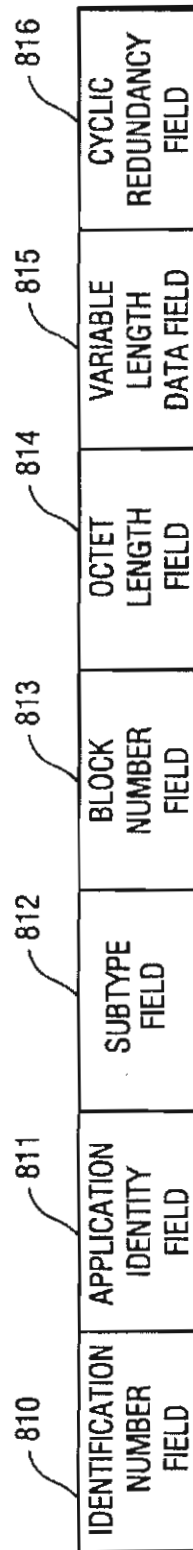


Fig. 7

U.S. Patent

Oct. 23, 2001

Sheet 8 of 8

US 6,308,204 B1

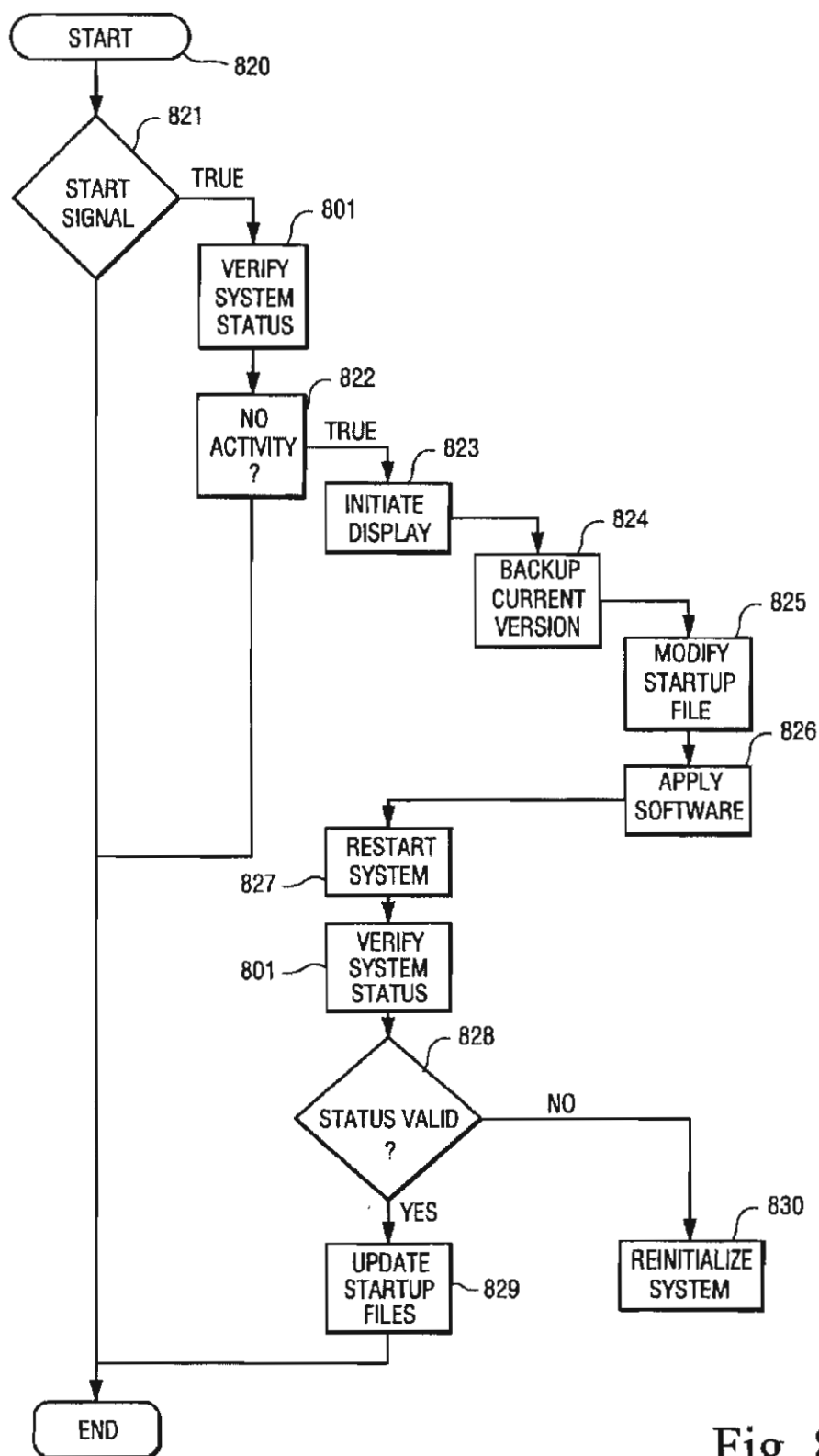


Fig. 8



US 6,308,204 B1

1

# **METHOD OF COMMUNICATIONS FOR AN INTELLIGENT DIGITAL AUDIOVISUAL PLAYBACK SYSTEM**

## **CROSS-REFERENCE TO RELATED APPLICATIONS**

This application is related to our copending commonly assigned applications:

U.S. Ser. No. 08/817,690 (Corres. to PCT/FR94/01185 filed Oct. 12, 1994);

U.S. Ser. No. 08/817,689 (Corres. to PCT/FR95/01334 filed Oct. 12, 1995);

U.S. Ser. No. 08/817,968 (Corres. to PCT/FR95/01335 filed Oct. 12, 1995);

U.S. Ser. No. 08/817,437 (Corres. to PCT/FR95/01336 filed Oct. 12, 1995)

U.S. Ser. No. 08/817,426 (Corres. to PCT/FR95/01337 filed Oct. 12, 1995); and

U.S. Ser. No. 08/817,438 (Corres. to PCT/FR95/01338 filed Oct. 12, 1995).

## **BACKGROUND OF THE INVENTION**

### **Field of the Invention**

The invention relates to a communications process for a payment-triggered audiovisual reproduction system.

These audiovisual reproduction systems are generally found in cafes or pubs. This type of system is composed of a sound reproduction machine usually called a jukebox linked to a monitor which displays video images or video clips. To do this the jukebox is equipped with a compact video disk player and a compact video disk library and includes selection buttons which locate the titles of pieces of music which are available. Payment of a proper fee followed by one or more selections authorizes activation of the system with automatic loading in the player of the disk on which the selected piece is found, the desired audiovisual reproduction then being able to start.

These systems, although allowing faithful and good quality reproduction, nevertheless have major defects. Thus, a first defect relates to the space necessary for storing the library; this consequently entails that the system will have large dimensions and will be bulky. Likewise these systems which call on mostly mechanical hardware using sophisticated techniques have high fault rates; this is another defect. Finally, it is very unusual for all the pieces on a disk to be regularly heard; some are almost never played, but still cannot be eliminated. Besides this defect, the additional problems are caused by the companies which manage and distribute these systems. More particularly, placing in the circuit a limited number of identical disks and imposing a certain rotation on their customers sometimes results in an unpleasant wait for the customers when a disk is not available.

In addition, patent application PCT/WO 93 18465 discloses computerized jukeboxes which allow reception via a telecommunications network and a modem connecting the jukeboxes to the network, digital data comprising remotely loaded songs or musical pieces in a mass storage of the jukeboxes. The communications systems is likewise used for remote loading of representative files of digitized graphics information, the songs and graphics files being compressed before they are sent over the network. The jukebox processor then uses these files by decompressing them and sending the graphics data to the video circuit and the song data to the audio circuit.

However, the processor also manages the man/machine interface, and management of these different elements is

2

done by sequentially displaying the graphics images representative of the song, then by responding to the touch action of the user, then checking that the user has paid the prescribed amounts, and finally when the required amount has been accounted, placing the selection in a queue for its subsequent performance. This system can only operate by first displaying the graphics images and then starting performance of the song because the processor cannot, according to the flowcharts, execute two tasks at one time. Finally, the graphics representations are uniquely data digitized by a scanner table of the album cover of the song. In no case does this jukebox allow display of moving images during the broadcast of the song or music. Likewise, since the processor is used for digital data decompression and processing for conversion into audio signals, it cannot consider the new actions of a user making a new selection. This is apparent, notably on page 12 of the PCT application, lines 25 to 27. Selection of new songs can only be done when the jukebox is in the attraction mode, i.e., the mode in which it displays graphics representations of different songs stored in the jukebox in succession.

U.S. Pat. No. 4,956,768 discloses a broadband server for transmitting music or images formed by a main processor communicating by a DMA channel with a hard disk and output cards, each controlled by a supplementary local processor which manages an alternative mode of access to two buffer memories A and B. Memory A is used to deliver, for example, musical data to a user, while the other is filled. Each of the output cards is connected to a consultation station, which can be local and situated in the same vicinity as the server or, alternatively, at a distance and connected by an audio or video communications network. The server receives data block-by-block and ensures that the sample parities are correct and rejects a block including more than two successive wrong samples. Each of these blocks is of course designated by a number. Once a block has been accepted, it can be stored on the local hard disk by recording its ordinal number which has no relation to its physical address on the hard disk. The consultation stations have audio and video outputs such as loudspeakers or headphones and a television monitor which makes it possible to listen to music or display images in response to requests received from terminals included in the consultation stations. In this system, the consultation stations where the first communications processor exists must have specific software for management of selection requests for musical pieces or video. It is only when the request has been made and addressed to the broadband server processor that it can transfer, under the authority of the local processor, the data in the buffer memories, such that this local processor ensures that the data are sent to the consultation stations. Moreover, it is specified that the output cards and buffer memories are filled only after having received the authorization of the local processor of the card.

Consequently, this system can only function within the framework of a multiprocessor device and does not in any way suggest use of this server for a jukebox controlled by a single processor operating in a multitask environment. This system proposed by this U.S. patent thus implements a complex process which allows delivery of a service to several consultation stations; this complex process is thus costly and incompatible with a system of jukeboxes, of which the cost and price should be as low as possible.

Moreover the process of downloading by a central site of digitized audio and video files to the local servers is accomplished via a specialized line communicating unidirectionally with the V35 interfaces of the local server, and allowing

US 6,308,204 B1

3

passage of 64 kilobit frames. Thus a second parallel communication must be established via the switched telephone network by a serial interface to allow exchange of service data. It is specified that it is preferable to transmit new musical pieces to the broadband server at night to leave the system free for users during the day, and that transmission can be done continuously and simultaneously for all local servers, provided that they can register continuously, i.e., at night.

This device can only work to the extent that the central server is the master and the local servers are slaves. This thus entails availability of local servers at the instant of establishing communications; this is enabled by the local servers having a double processor which relieves the communication processor for a sufficient interval. In a single-processor architecture it is thus difficult to establish communications according to this protocol determined with a variable number of jukebox stations to allow remote operations such as downloading of music or video following a selection by the jukebox manager or sending statistics to the center or recovering data concerning billing or security management of the units, or recovery for analysis and survey distribution.

The object of the invention is to eliminate the various aforementioned defects of the systems of the prior art, and to provide a system of communications between jukebox units allowing reproduction and display of audiovisual digital information and a central server which supports, among various functions, downloading of data.

This object is achieved by the communications process operating in a conference mode and it includes the following stages:

- sending a heading before any transaction which includes the identity of the destination, identity of the sender, and the size of the packets;
- sending a server response in the form of a packet of data, each packet sent by the server being encoded using the identification code of the jukebox software;
- receiving a data packet by the decoding jukebox, wherein the packet at the same time checks the data received using the CRC method and sending a reception acknowledgment to the server indicating the accuracy of the received data to allow it to prepare and send a new packet to the unit destination.

According to another operating mode the server can send the data by stream, the stream including several packets, and the receiver unit will then perform decoding and storage, and after receiving the indicator of the last packet, will signal the defective packets received at the server.

According to another feature, each packet contains a first field allowing identification of the seller, a second field allowing indication of the identification of an application, this 32 bit field making it possible to specify whether it is a digital song, digital video, stationary image, software update, statistics, billing, or update of the unit database, a third field indicating the identification of a single type of application such as the identification number of the product, the type of billing, the difference between a midi song and a digital song, last block indication, finally a fourth field indicating the sequence number of the block in the transmission, a fifth block indicating the length of this block in octets, a sixth field composed of variable length data, a seventh field composed of cyclic redundancy verification data.

An object of the invention is to eliminate the various defects of the systems of the prior art by providing an

4

intelligent digital audiovisual reproduction system which is practical to implement, compact, reliable, authorizes storage at the title level as well as easy deletion or insertion of titles not listened to or wanted, all this while maintaining performance and a high level of reproduction quality.

Another object of the invention is to provide a standard protocol which moreover allows the features mentioned above for remote updating of software.

The objects are achieved by the fact that the jukebox units contain software for interpretation of the second field of the communications packets which detect the code corresponding to remote updating of the software and after having verified that the software version number is greater than the version installed on the unit, initiates a system status verification procedure to ensure that there is no activity underway on the jukebox. If yes, the unit displays a wait message, during reception of the new software version on the screen, copies the back-up of the software version installed on the unit, modifies the system startup file for startup with the backup version, then begins execution of the new version of the software, verifies the state of system status after execution of this new version, reinitializes the system startup files for startup with the new version. In the case in which the status is not OK, the software reinitializes the system with the old version and signals a reception error to the central server.

According to another feature, each audiovisual reproduction system contains a multitask operating system which manages, using a primary microprocessor, the video task, the audio task, the telecommunications task, the input task (keyboard, screen, touch) and a status buffer is linked to each of the tasks to represent the activity or inactivity of this task.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Other advantages and features of the invention follow from the following description, with reference to the attached drawings, given by way of a non-limiting example only, in which:

FIG. 1 shows a circuit diagram of the hardware comprising the invention;

FIG. 2 shows an organizational chart of the service modules specific to a task and managed via a multitask operating system, the set of modules being included in a library stored in the storage means;

FIG. 3 shows the organization of the multitask system which manages the set of hardware and software;

FIG. 4 shows a flowchart describing the operation of the multitask management system;

FIG. 5 shows a flowchart for verifying task activity;

FIG. 6 schematically shows the database structure;

FIG. 7 shows the structure of the packets used in the communications protocol;

FIG. 8 shows a method of updating the software which can be done using the invention protocol.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferably, but in a nonrestrictive manner, the audiovisual reproduction system uses the aforementioned listed components.

Microprocessor central unit 1 is a high performance PC-compatible system, the choice for the exemplary embodiment being an Intel 80486 DX/2 system which has storage means and the following characteristics:

compatibility with the local Vesa bus,



US 6,308,204 B1

5

processor cache memory: 256 kO,  
RAM of 32 MO  
high performance parallel and serial ports,  
SVGA microprocessor graphics adapter,  
type SCSI/2 bus type controller,  
battery backed-up static RAM

Any other central unit with similar, equivalent or superior performance can be used in accordance with the invention.

This central unit controls and manages audio control circuit (5), telecommunications control circuit (4), input control circuit (3), mass storage control circuit (2), and display means control circuit (6). The display means consist essentially of a 14 inch (35.56 cm) flat screen video monitor (62) without interleaving of the SVGA type, with high resolution and low radiation, which is used for video reproduction (for example, the covers of the albums of the musical selections), graphics or video clips.

Likewise comprising part of the storage means, storage modules (21) using hard disks of the high speed and high capacity SCSI type are connected to the storage means already present in the microprocessor device. These modules allow storage of audiovisual data.

High speed 28.8 k/bps telecommunications modem adapter (41) is integrated to authorize the connection to the audiovisual data distribution network controlled by a central server.

To reproduce the audio data of the musical selections, the system includes loudspeakers (54) which receive the signal from tuner amplifier (53) connected to electronic circuit (5) of the music synthesizer type provided to support a large number of input sources, while providing an output with CD (compact disk) type quality, such as for example a microprocessor multimedia audio adapter of the "Sound Blaster" card type SBP32AWE from Creative Labs Inc. on which two buffer memories (56, 57) are added for a purpose to be explained below.

Likewise the control circuit of the display means includes two buffer memories (66, 67) for a purpose to be explained below.

A thermally controlled 240 watt ventilated power supply provides power to the system. This power supply is protected against surges and harmonics.

The audiovisual reproduction system manages via its input controller circuit (3) a 14 inch (35.56 cm) touch screen "Intelli Touch" (33) from Elo Touch Systems Inc. which includes a glass coated board using "advanced surface wave technology" and an AT type bus controller. This touch screen allows, after having displayed on video monitor (62) or television screen (61) various selection data used by the customers, management command and control information used by the system manager or owner. It is likewise used for maintenance purposes in combination with external keyboard (34) which can be connected to the system which has a keyboard connector for this purpose, controlled by a key lock (32) via interface circuit (3).

Input circuit (3) likewise interfaces with the system a remote control set (31) composed for example of:

an infrared remote control from Mind Path Technologies Inc., an emitter which has 15 control keys for the microprocessor system and 8 control keys for the projection device.

an infrared receiver with serial adapter from Mind Path Technologies Inc.

A fee payment device (35) from National Rejectors Inc. is likewise connected to input interface circuit (3). It is also possible to use any other device which allows receipt of any

6

type of payment by coins, bills, tokens, magnetic chip cards or a combination of means of payment.

To house the system a chassis or frame of steel with external customizable fittings is also provided.

Besides these components, wireless microphone (55) is connected to audio controller (5); this allows transformation of the latter into a powerful public address system or possibly a karaoke machine. Likewise a wireless loudspeaker system can be used by the system.

Remote control set (31) allows the manager, for example from behind the bar, access to and control of various commands such as:

microphone start/stop command,  
loudspeaker muting command,  
audio volume control command;

command to cancel the musical selection being played.

The system operating software has been developed around a library of tools and services largely oriented to the audiovisual domain in a multimedia environment. This library advantageously includes an efficient multitask operating system which efficiently authorizes simultaneous execution of multiple fragments of code. This operating software thus allows concurrent execution, in an orderly manner and avoiding any conflict, of operations performed on the display means, audio reproduction means as well as management of the telecommunications lines via the distribution network. In addition, the software has high flexibility.

The digitized and compressed audiovisual data are stored in storage means (21).

Each selection is available according to two digitized formats: hi-fi and CD quality.

Prior to describing and reading this organization chart in FIG. 2, it must be noted that while all these modules described separately seem to be used sequentially, in reality the specific tasks of these modules are executed simultaneously in an environment using the multitask operating system. Consequently the organizational chart indicates the specific operations which the module must perform and not a branch toward this module which would invalidate all the operations performed by the other modules.

The first module, labeled SSM, is the system startup module. This module does only one thing, consequently it is loaded automatically when the system is powered up. If the system is started with a correct registration number it then directly enters the "in service" mode of the module labeled RRM.

The REG module is the registration mode module which, when it is activated for the first time or when approval for a new registration is necessary, indicates its software serial number and requests that the user enter his coordinates, such as the name of the establishment, address and telephone number.

The RMM module is the module of the "in service" mode which is the mode of operation which the system enters when its registration number has been validated. In this mode the system is ready to handle any request which can be triggered by various predefined events such as:

customers touching the screen: when a customer or user touches the screen, the system transfers control of the foreground session to the customer browsing and selection mode CBSM module,

telecommunications network server call requests: when the system detects a loop on the phone line, it emits an asynchronous background procedure: the telecommunications services mode TSM module,

requests concerning key switch (32): when the manager turns the key switch the system hands over control of its foreground session to the management mode SMM module,

US 6,308,204 B1

7

reception of a remote control signal: when a command is received, it is processed in a background session by the system command 5 MM module while the foreground session remains available for other interventions,

appearance of end of timing, showing inactivity of the system: when one of the various timers is activated, control is temporarily handed over to the inactivity routines IPM module for processing.

The system remains in the "in service" mode until one of the above described events takes place.

The IRM module is the inactivity routines module. It contains the routines which perform predetermined functions such as album cover display, broadcast of parts of musical pieces present in the system, reproduction of complete selections for internal promotional purposes, audio reproductions for external promotional purposes, spoken promotional announcements of new musical selections, withdrawal to an auxiliary source which can be called when the system is inactive and when a predefined but adjustable time interval corresponding to a timer has expired.

The SMM module is the system commands module. This module allows execution of functions which command the system to accept a required input by an infrared remote control device, these functions being handled instantaneously without the process underway being stopped. A very large number of these functions are possible, only some are listed below, in a nonrestrictive manner:

- audio volume control of the played selections,
- audio volume control of the auxiliary played source,
- microphone start/stop command,
- microphone audio volume control,
- balance control, left channel, right channel,
- control of base frequency level,
- control of treble frequency level,
- command to cancel or skip a musical selection,
- panoramic effects command, zoom forward, zoom back,
- triggering of reset of the software program.

The MMM module is the management mode module. This module is triggered when the key switch is turned by the manager. The display of an ordinary screen is replaced by a display specific to system management. With this new display the manager can control all the settings which are possible with remote control. He can likewise take control of additional low level commands allowing for example definition of commands to be validated or invalidated on the remote control. He is also able to define a maximum of high and low levels for each system output source, these limits defining the range available on the remote control. Using this screen the manager can access the mode of new selection acquisitions by touching a button located on the touch screen. When the manager has succeeded in defining these commands as well as the system configuration, it is then enough to remove the key and the system returns automatically to the "in service" mode.

The NSAM module is the new selections acquisition mode module.

The CBSM module is the customer browsing and selection mode module. Access to this module is triggered from the "in service" when the customer touches the screen. The display allows the user to view a menu provided for powerful browsing assisted by digitized voice messages to guide the user in his choice of musical selections.

The TSM module is the telecommunications services mode module between the central server and the audiovisual reproduction system. This module allows management of all

8

management services available on the distribution network. All the tasks specific to telecommunications are managed like the background tasks of the system. These tasks always use only the processing time remaining once the system has completed all its foreground tasks. Thus, when the system is busy with one of its higher priority tasks, the telecommunications tasks automatically will try to reduce the limitations on system resources and recover all the microprocessor processing time left available.

The SSC module is the system security control module. This module manages security, each system is linked to a local controller system according to a preestablished time pattern for acquisition of the approval signal in the form of the registration number authorizing it to operate. In addition, if cheating has been detected or the system cannot communicate via the network, said system automatically stops working.

The SPMM module allows management of musical selections, songs or video queued by the system for execution in the order of selection.

Finally, the SMM module allows remote management of system settings by the manager by remote control.

The multitask operating system comprises the essential component for allowing simultaneous execution of multiple code fragments and for managing priorities between the various tasks which arise.

This multitask operating system is organized as shown in FIG. 3 around a kernel comprising module (11) for resolving priorities between tasks, task supervisory module (12), module (13) for serialization of the hardware used, and process communications module (14). Each of the modules communicates with application programming interfaces (15) and database (16). There are as many programming interfaces as there are applications. Thus, module (15) includes first programming interface (151) for key switch (32), second programming interface (152) for remote control (31), third programming interface (153) for touch screen (33), fourth programming interface (154) for keyboard (34), fifth programming interface (155) for payment device (35), sixth programming interface (156) for audio control circuit (5), seventh programming interface (157) for video control circuit (6), and last interface (158) for telecommunications control circuit (4).

Five tasks with a decreasing order of priority are managed by the kernel of the operating system, the first (76) for the video inputs/outputs has the highest priority, the second (75) of level two relates to audio, the third (74) of level three to telecommunications, the fourth (73) of level four to interfaces and the fifth (70) of level five to management. These orders of priority will be considered by priority resolution module (11) as and when a task appears and disappears. Thus, as soon as a video task appears, the other tasks underway are suspended, priority is given to this task and all the system resources are assigned to the video task. At the output, video task (76) is designed to unload the video files of the mass memory (21) alternately to one of two buffers (66, 67), while other buffer (67 or 66) is used by video controller circuit (6) to produce the display after data decompression. At the input, video task (76) is designed to transfer data received in telecommunications buffer (46) to mass storage (21). It is the same for audio task (75) on the one hand at the input between telecommunications buffer (46), and buffer (26) of mass memory (21), and on the other hand at the output between buffer (26) of mass memory (21) and one of two buffers (56, 57) of audio controller circuit (5).

The task scheduler module will now be described in conjunction with FIG. 4. In the order of priority this module



US 6,308,204 B1

9

performs first test (761) to determine if the video task is active. In the case of a negative response it passes to the following test which is second test (751) to determine if the audio task is still active. In the case of a negative response third test (741) determines if the communications task is active. After a positive response to one of the tests, at stage (131) it fills memory access request queue (13) and at stage (132) executes this storage request by reading or writing in the mass storage, then loops back to the first test. When the test on communications activity is affirmative, scheduler (12) performs a test to determine if it is a matter of reading or writing data in the memory. If yes, the read or write request is placed in a queue at stage (131). In the opposite case, the scheduler determines at stage (743) if it is transmission or reception and in the case of transmission sends by stage (744) a block of data to the central server. In the case of reception the scheduler verifies that the kernel buffers are free for access and in the affirmative sends a message to the central server to accept reception of a data block at stage (747). After receiving a block, error control (748) of the cyclic redundancy check type (CRC) is executed and the block is rejected at stage (740) in case of error, or accepted in the opposite case at stage (749) by sending a corresponding message to the central server indicating that the block bearing a specific number is rejected or accepted, then loops back to the start tests. When there is no higher level task active, at stage (731 or 701) the scheduler processes interface or management tasks.

Detection of an active task or ready task is done as shown in FIG. 5 by a test 721 to 761 respectively on each of the respective hardware or software buffers (26) of the hard disk, (36) of the interface, (46) of telecommunications, (56 and 57) of audio, (66 and 67) of video which are linked to each of respective controller circuits (2, 3, 4, 5, 6) of each of the hardware devices linked to central unit (1). Test (721) makes it possible to check if the data are present in the buffer of the disk input and output memory, test (731) makes it possible to check if the data are present in the buffers of the hardware or software memory buffers of the customer interface device, test (741) makes it possible to check if the data are present in the buffers of the hardware or software memory of the telecommunications device, test (751) makes it possible to check if the data are present in the buffer of the hardware or software memory for the direction, test (761) makes it possible to check if the data are present in the hardware or software memory buffers of the video device. If one or more of these buffers are filled with data, scheduler (12) positions the respective status buffer or buffers (821) for the hard disk, (831) for the interface, (841) for telecommunications, (851) for audio, (861) for video corresponding to the hardware at a logic state illustrative of the activity. In the opposite case the scheduler status buffers are returned at stage (800) to a value illustrative of inactivity.

Due, on the one hand, to the task management mode assigning highest priority to the video task, on the other hand, the presence of hardware or software buffers assigned to each of the tasks for temporary storage of data and the presence of status buffers relative to each task, it has been possible to have all these tasks managed by a single central unit with a multitask operating system which allows video display, i.e., moving images compared to a graphic representation in which the data to be processed are less complex. This use of video display can likewise be done without adversely affecting audio processing by the fact that audio controller circuit (5) includes buffers large enough to store a quantity of compressed data sufficient to allow transfer of video data to one of video buffers (66, 67) during audio processing while waiting for the following transfer of audio data.

10

Moreover, the multitask operating system which includes a library containing a set of tools and services greatly facilitates operation by virtue of its integration in the storage means and the resulting high flexibility. In particular, for this reason it is possible to create a multimedia environment by simply and efficiently managing audio reproduction, video or graphics display and video animation. In addition, since the audiovisual data are digitized and stored in the storage means, much less space is used than for a traditional audiovisual reproduction system and consequently the congestion of the system according to the invention is clearly less.

Database (16) is composed, as shown in FIG. 6, of several bases: first (161) with the titles of the audiovisual pieces, second (162) with the artists, third (163) with the labels, fourth (164) with albums, fifth (165) with royalties. First base (161) contains first item (1611) giving the title of the piece, second item (1612) giving the identification of the product, this identification being unique. Third item (1613) makes it possible to recognize the category, i.e., jazz, classical, popular, etc. Fourth item (1614) indicates the date of updating. Fifth item (1615) indicates the length in seconds for playing the piece.

Sixth item (1616) is a link to the royalties base. Seventh item (1617) is a link to the album. Eighth item (1618) is a link to the labels. Ninth item (1619) gives the purchase price for the jukebox manager;

Tenth item (1620) gives the cost of royalties for each performance of the piece;

Eleventh item (1610) is a link to the artist database. This link is composed of the identity of the artist. The artist database includes, besides the identity of the artist composed of item (1621), second item (1622) composed of the name of the artist or name of the group. The label database includes first item (1631) composed of the identity of the label, establishing the link to eighth item (1618) of the title database and second item (1632) composed of the name of the label. The album database contains first item which is the identity of the album (1641) which constitutes the link to seventh item (1617) of the title base. Second item (1642) comprises the title, third item (1643) is composed of the date of updating of the album, and fourth item (1644) composed of the label identity. The royalty base is composed of first item (1651) giving the identity of the royalty and corresponds to sixth item (1616) of the title base. Second item (1652) comprises the name of the individual receiving the royalties. Third item (1653) is composed of the destination address of the royalties. Fourth item (1654) is composed of the telephone and fifth item (1655) is composed of the number of a possible fax.

It is apparent that this database (16) thus makes it possible for the manager to keep up to date on costs, purchases of songs and royalties to be paid to each of the artists or groups of artists performing the songs or videos, this provided that a communications protocol allows loading of the songs and modification of the content of the database depending on the songs loaded and allows communications with the central server by uploading or downloading the corresponding information. This communication protocol is composed of a first stage during which the center requests communication with the unit to which the communication is addressed. The unit decodes the heading sent by the center and if it recognizes it, indicates to the center if it is available or not depending on the state of its system status determined as explained above. If it is not available the center will then send a new request. If it is available, the center begins to send a first data block and the following blocks in succes-

US 6,308,204 B1

11

sion. Each of the blocks is composed of a plurality of fields as shown in FIG. 7. First field (810) indicates the identification number of the seller; this allows multiple sellers to share a single communications link with the central site. Second field (811) indicates the application identity and makes it possible to distinguish between a digital song, a digital motion video, a stationary video or an stationary digital graphical image, allows updating of software, transmission of statistics, billing, updating of the database, transmission of surveys. Third field (812) makes it possible to identify a subtype of application such as the identity number of the product, type of billing, indication of a song in the MIDI standard or a digital song, or finally indication of whether it is the last block of a transmission. The following field (813) makes it possible to recognize the number of the block assigned sequentially to the block in this transmission. Fourth field (814) makes it possible to recognize the octet length of each transmission block. Fifth field (815) makes it possible to recognize variable length data of the transmission and sixth field (816) contains cyclic redundancy verification information which allows the jukebox to verify that there has not been any error in transmission by recomputing the values of this information from the received data. The data are coded with the identification number of the receiving station, i.e., the number of the jukebox; this prevents another station from receiving this information without having to pay royalties. This is another advantage of the invention because in the processes of the prior art it is not exactly known which stations have received messages and at the outside a cheat could indicate that the information has not been correctly received to avoid having to pay the royalties. Here this operation is impossible since the cheat does not have access to his identification number known solely by the computer and encoding done using this secret identification number makes it possible to prevent cheating and reception by other units not authorized to receive the information. Finally it can be understood that this protocol, by the information which the blocks contain, allows high flexibility of use, especially for transmitting video images or digitized songs, or again to allow updating of software as explained below according to the process in FIG. 8. In the case of software updating, the central system sends at stage (821) a first start signal allowing the jukebox for which it is intended to be recognized by its identification number and to indicate to this jukebox the number of the software version. At this stage (821) the jukebox then performs an initial verification to ensure that the version number is higher than the number of the versions installed and then initiates the process of verification of the system status indicated by stage (801). This verification process has already been described with reference to FIG. 7. In the case in which at stage (822) there is no system activity, at stage (823) the jukebox initiates display of a waiting message on the display device to prevent a user from interrupting the communication, and during this time receives the data composed of the new software to be installed. At stage (824) the unit backs up the current version and at stage (825) the unit modifies the startup file for startup with the backup version. After having completed this modification the unit at stage (826) applies the software received to the system software and restarts the system software at stage (827). After having restarted the system, the unit re verifies status (801) and at stage (828) determines if the system statuses are valid or not. In the case in which no errors are detected, at stage (829) the unit updates the startup files with the newly received version and returns to a waiting state. If an error is detected, the unit reinitializes the system at stage (830).

12

Once installation is completed, the unit awaits occurrence of an event representative of a task in order to handle its tasks as illustrated above.

Due to the flexibility of the multitask system and its communications protocol, each unit of the jukebox can thus be selected independently of the units connected to the network and can update the databases or the version of the desired song or again the software version without disrupting the operation of the other units of the network and without having to wait specifically for all the units of a network to be available. This is independent of the modems used which can be of the high speed type for a standard telephone line or a specialized modem on a dedicated data link or a SDN modem for fiber optic transmission or again an IRD modem for satellite connection.

If one or more packets are not received correctly by the jukebox during transmission, it does not interrupt transmission since other jukeboxes can also be in communication. However when communication is stopped by the central server, each jukebox which has had a incident takes a line and signals the numbers of the packets not received to the center. This allows the center to resend them. If registration of one or more songs or videos or part of a song or video has not been done due to lack of enough space on the disk or storage means, the system of each jukebox signals to the manager by a display or audio message the packet number if it is part of a song or a video, or the numbers of the song or video which have not been registered for lack of space. This allows the manager, after having decided to erase certain songs or videos from the hard disk, to again request that the center send these songs or videos or the part not received.

Any modification by one skilled in the art is likewise part of the invention. Thus, regarding buffers, it should be remembered that they can be present either physically in the circuit to which they are assigned or implemented by software by reserving storage space in the system memory.

What is claimed is:

1. A jukebox system, comprising:

a jukebox device including a microprocessor, a memory that stores audiovisual items that may be played on the jukebox device in response to requests by a user, a display for displaying video, an audio arrangement providing audio, a communication system for enabling the jukebox device to communicate with an audiovisual distribution network, and a multitasking operating system that enables simultaneous operation the microprocessor, the display, the audio arrangement and the communication system; and

a server remote to said jukebox device that can be accessed by said jukebox device through said distribution network, wherein said server is operable to register said jukebox for operation through communication with the jukebox device;

wherein said jukebox device includes operating software that controls the operation of said jukebox, and said server is operable to send data to said jukebox device which is interpreted by said jukebox as a request by said server to remotely update said operating software on said jukebox;

and further wherein, upon receipt by said jukebox of said data from said server indicating a request to remotely update said operating software, said jukebox device is operable to modify start-up operation of said jukebox device such that said jukebox device will operate in accordance with new operating software received from said server over said distribution network.

2. The jukebox system of claim 1, wherein upon receipt of said data, said jukebox is operable to verify if a version

US 6,308,204 B1

13

number of current software is outdated, and further wherein, if said version number is outdated, said jukebox performs a back up of current operating software, modifies a system startup file for startup with the back up of the current software, begins execution of the a new version of said software, verifies proper operation of said new version of said software, and, if said new version properly operates,

14

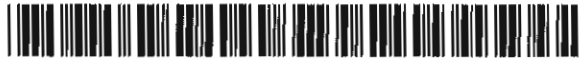
reinitializes the system startup file for startup with the new version.

3. The jukebox system of claim 2, wherein if said verification of said new version indicates an error, said jukebox device is operable to reinitialize said current version of said software, and to send an error message to said server.

\* \* \* \* \*

# **Exhibit B**





US006578051B1

(12) **United States Patent**  
**Mastronardi et al.**

(10) Patent No.: US 6,578,051 B1  
(45) Date of Patent: Jun. 10, 2003

(54) **DEVICE AND PROCESS FOR REMOTE  
MANAGEMENT OF A NETWORK OF  
AUDIOVISUAL INFORMATION  
REPRODUCTION SYSTEMS**

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Assistant Examiner—Cam-Linh Nguyen

(74) Attorney, Agent, or Firm—Nixon & Vanderbye, PC

(57) ABSTRACT

Management device for a network of audiovisual information reproduction systems or jukeboxes, including a database with a plurality of sets of arrays, each array containing grouped information either about the composition of a jukebox, or the use of the jukebox, or the payment of fees. The database is managed by a computer server connected with the audiovisual information reproduction systems to receive messages sent by each audiovisual information reproduction device and containing information necessary to update determined sets of arrays in the database, and update data or the program for each audiovisual information reproduction device with information stored in at least one set of arrays in the database and transmitted in this message.

**2 Claims, 14 Drawing Sheets**

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(22) Filed: Jun. 21, 2000

(30) Foreign Application Priority Data

May 10, 2000 (FR) ..... 00 05938

(51) Int. Cl.<sup>7</sup> ..... G06F 17/30

(52) U.S. Cl. .... 707/104.1; 381/124

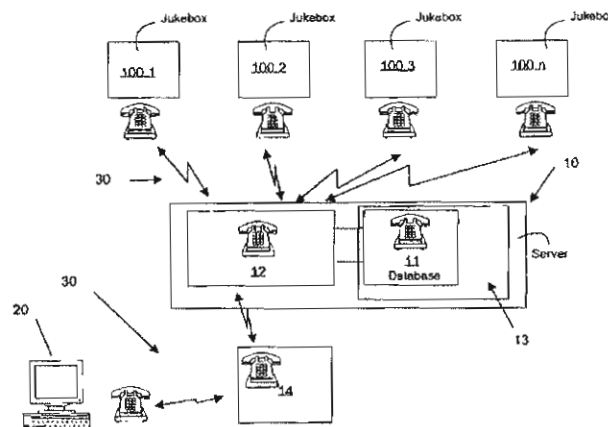
(58) Field of Search ..... 455/185.1; 381/124;  
707/104.1

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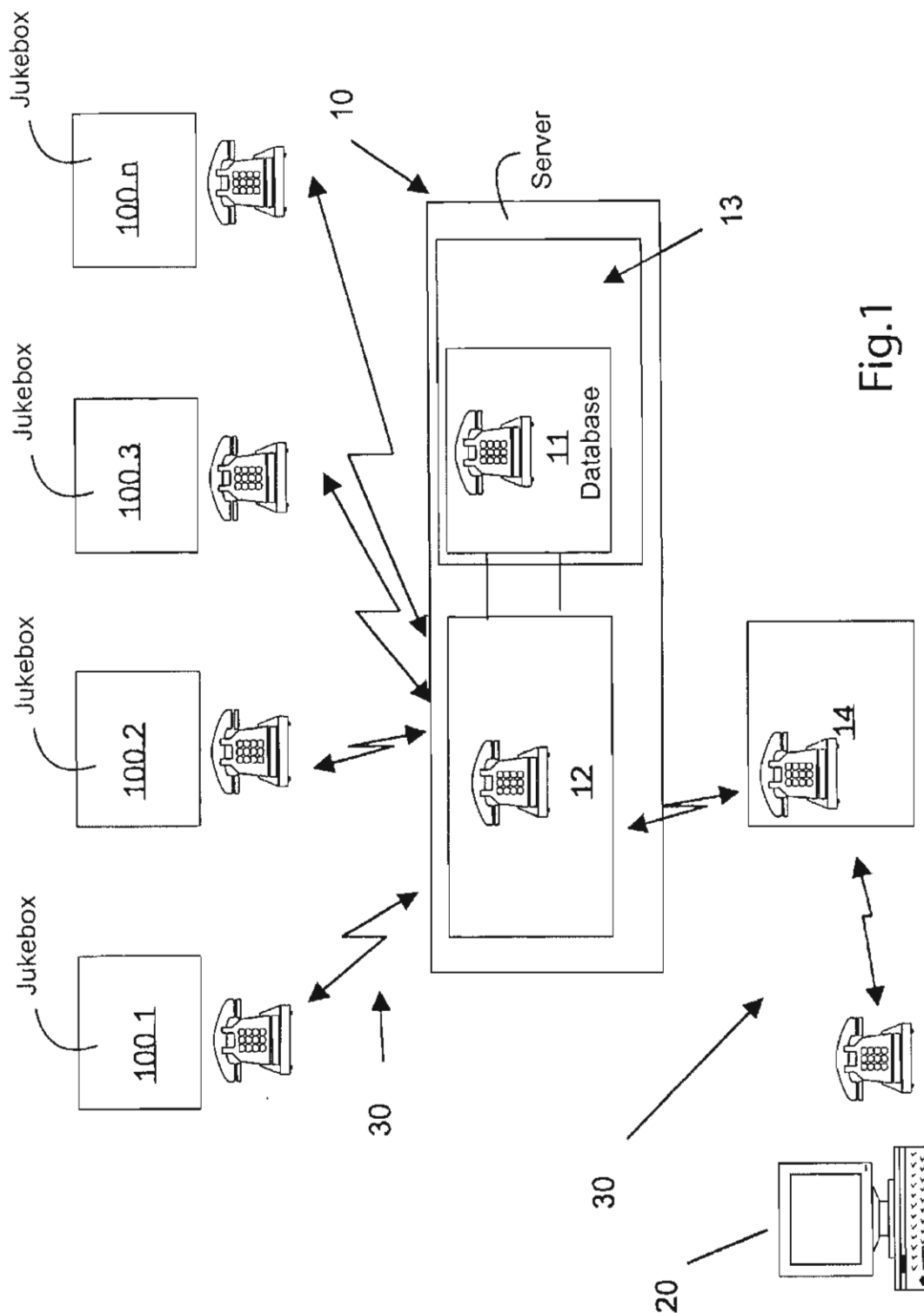
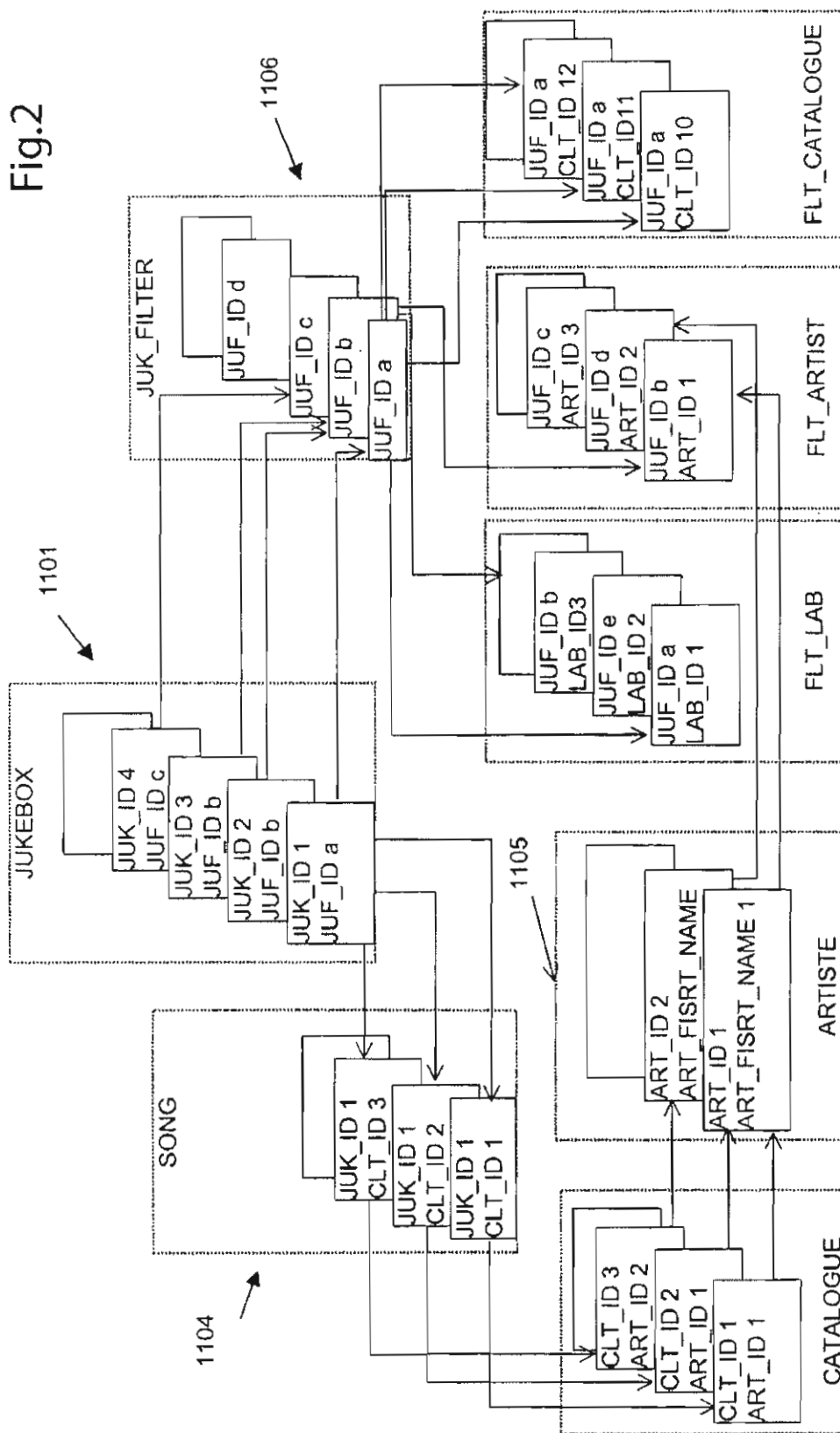


Fig. 2



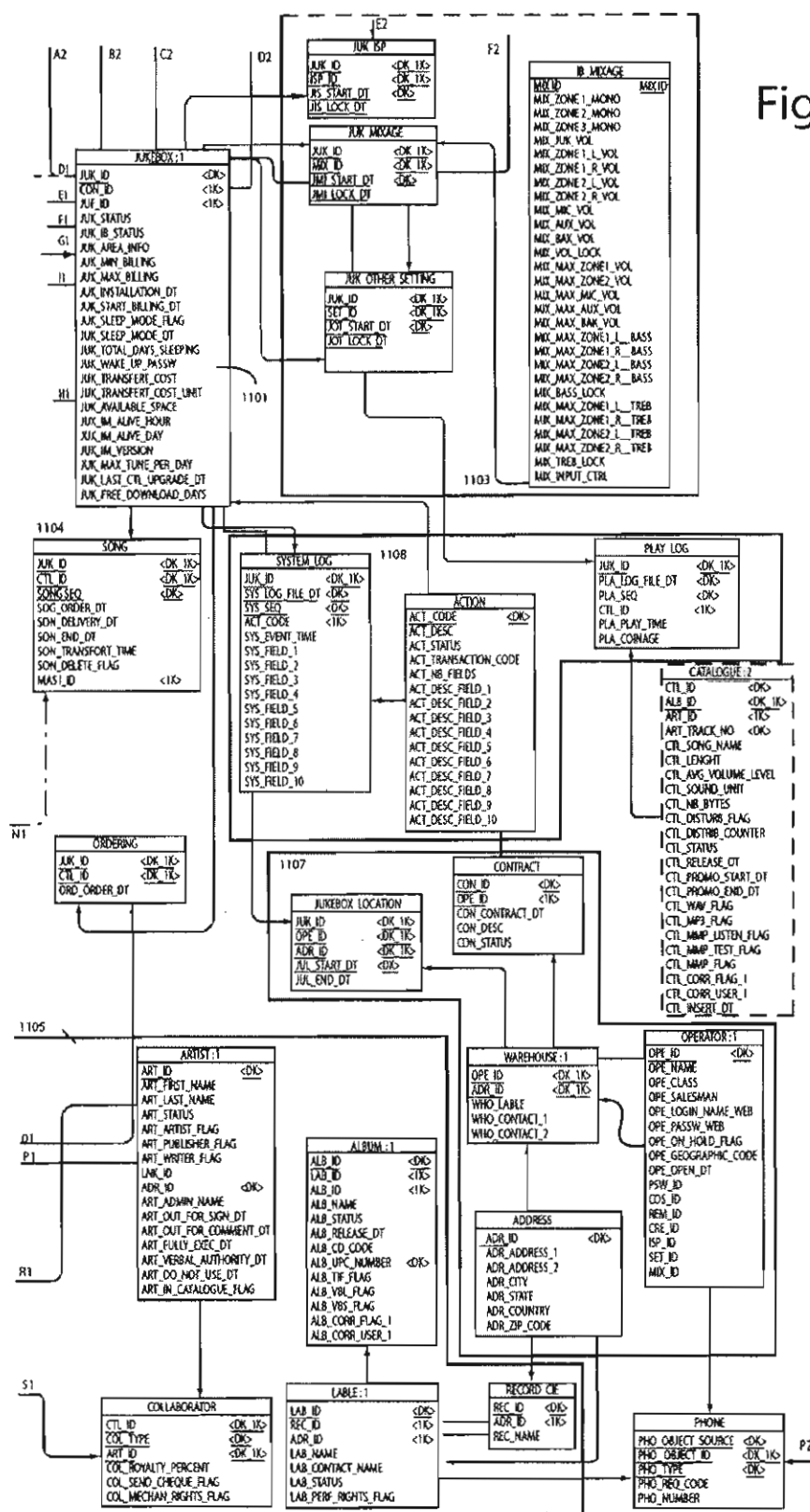


U.S. Patent

Jun. 10, 2003

Sheet 3 of 14

US 6,578,051 B1



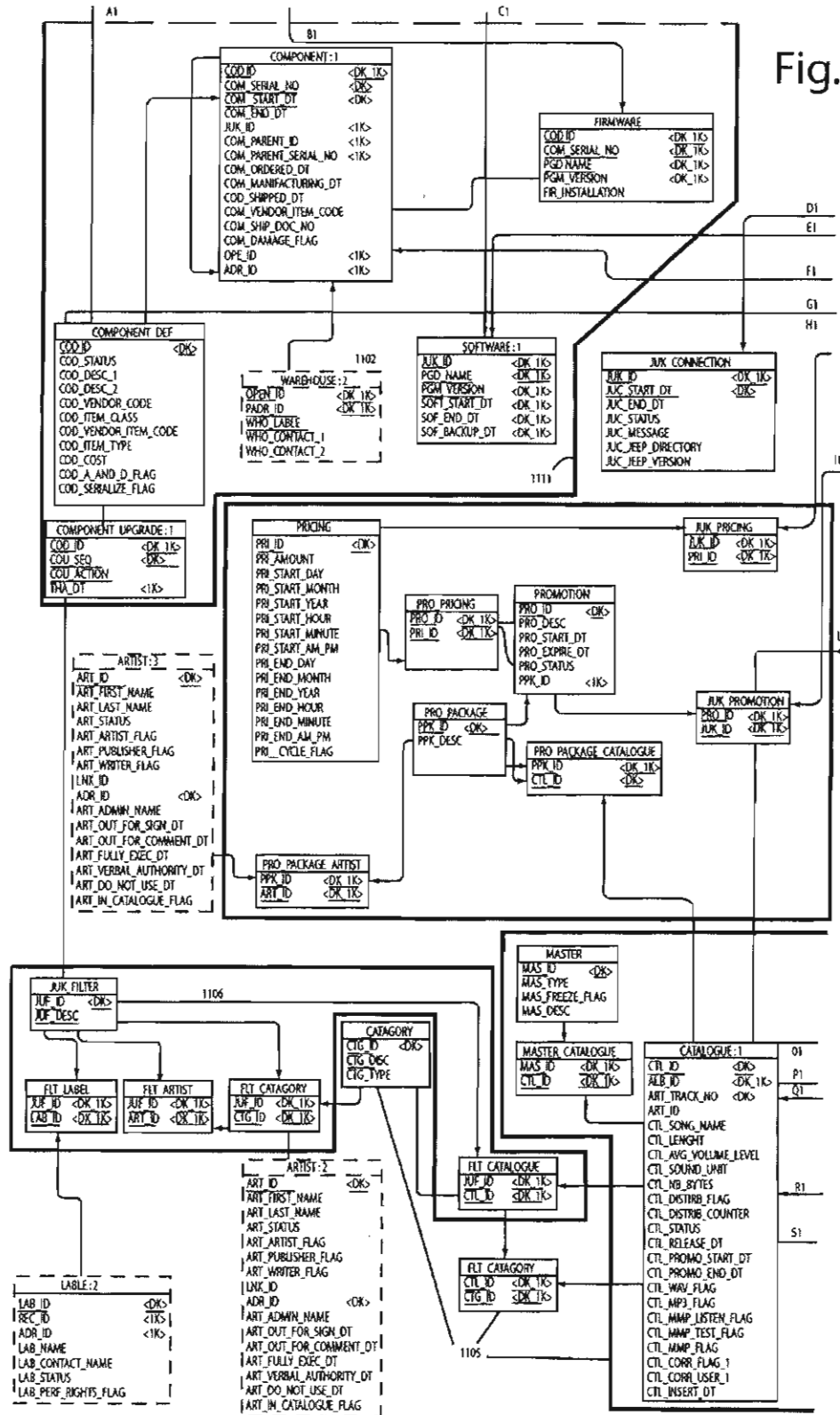
U.S. Patent

Jun. 10, 2003

Sheet 4 of 14

US 6,578,051 B1

Fig.3B



U.S. Patent

Jun. 10, 2003

Sheet 5 of 14

US 6,578,051 B1

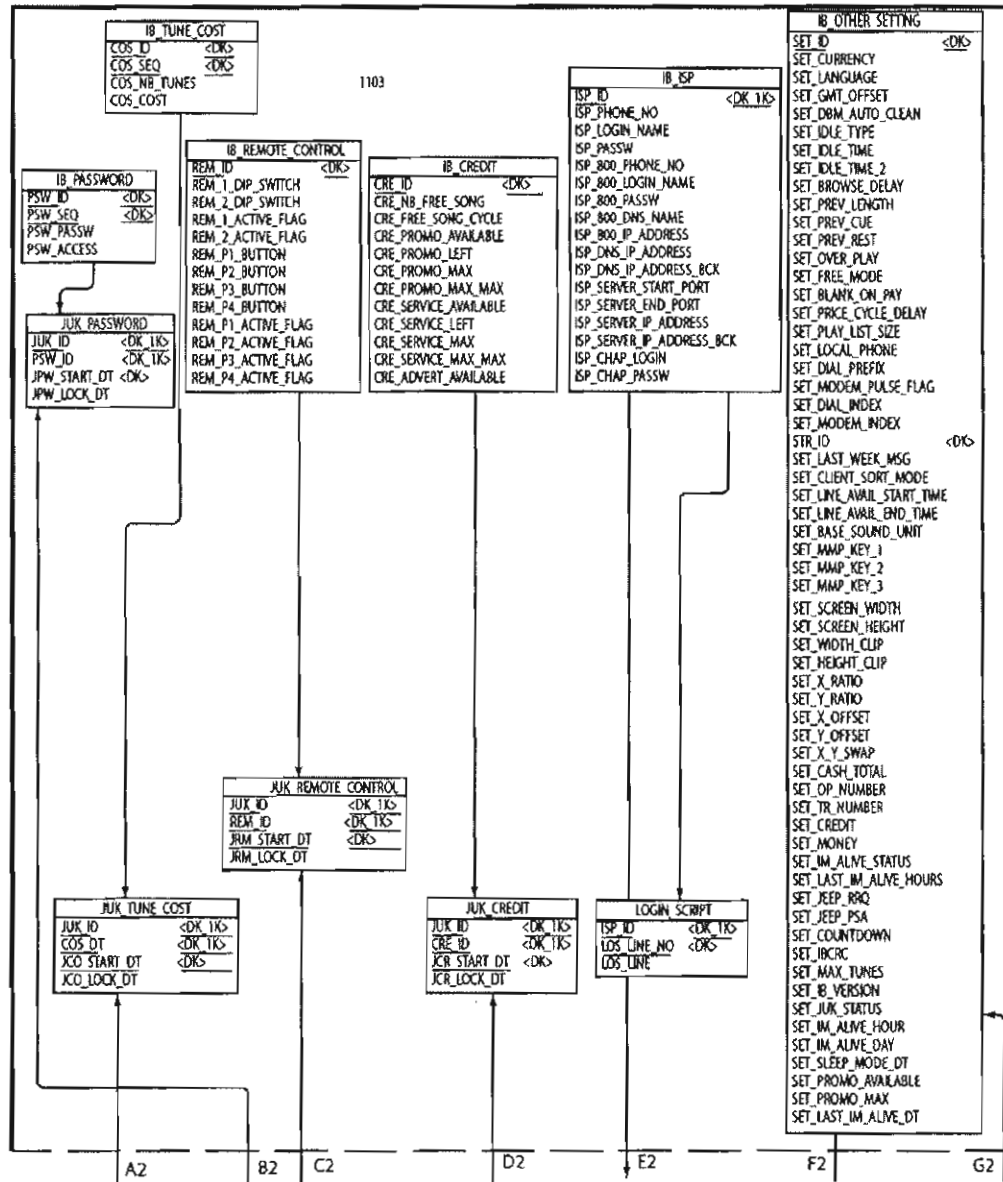


Fig.3C



U.S. Patent

Jun. 10, 2003

Sheet 6 of 14

US 6,578,051 B1

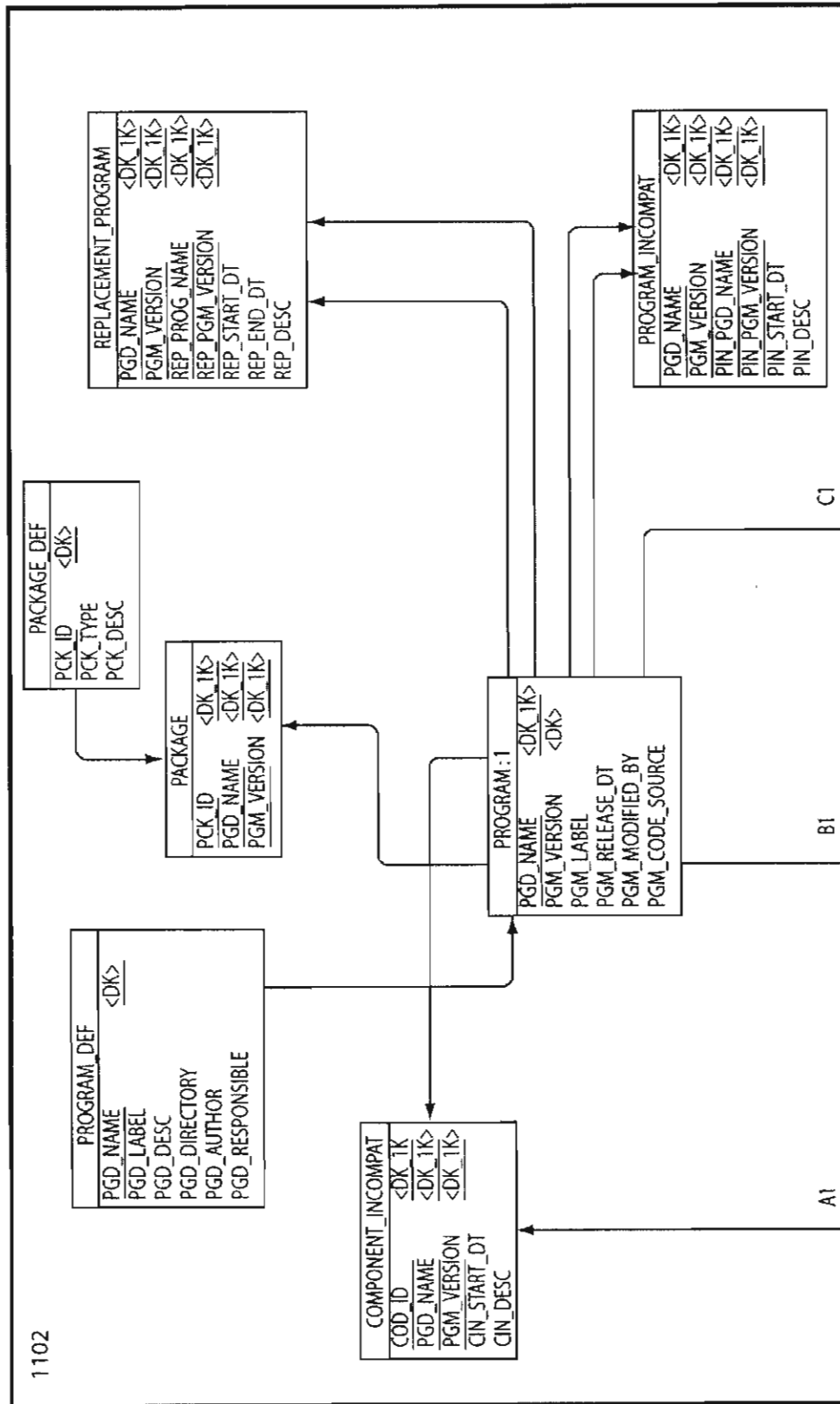


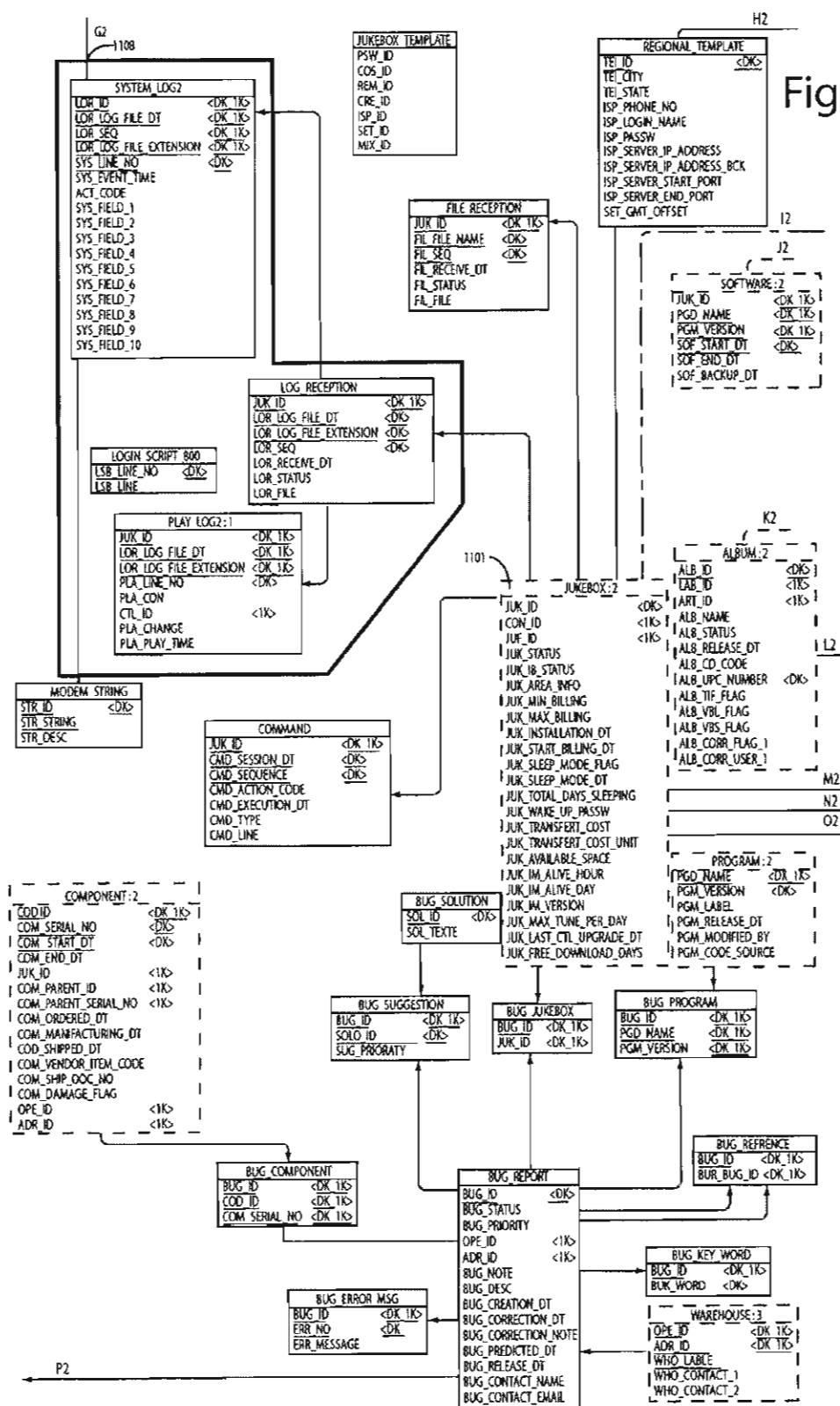
Fig.3D

U.S. Patent

Jun. 10, 2003

Sheet 7 of 14

US 6,578,051 B1



U.S. Patent

Jun. 10, 2003

Sheet 8 of 14

US 6,578,051 B1

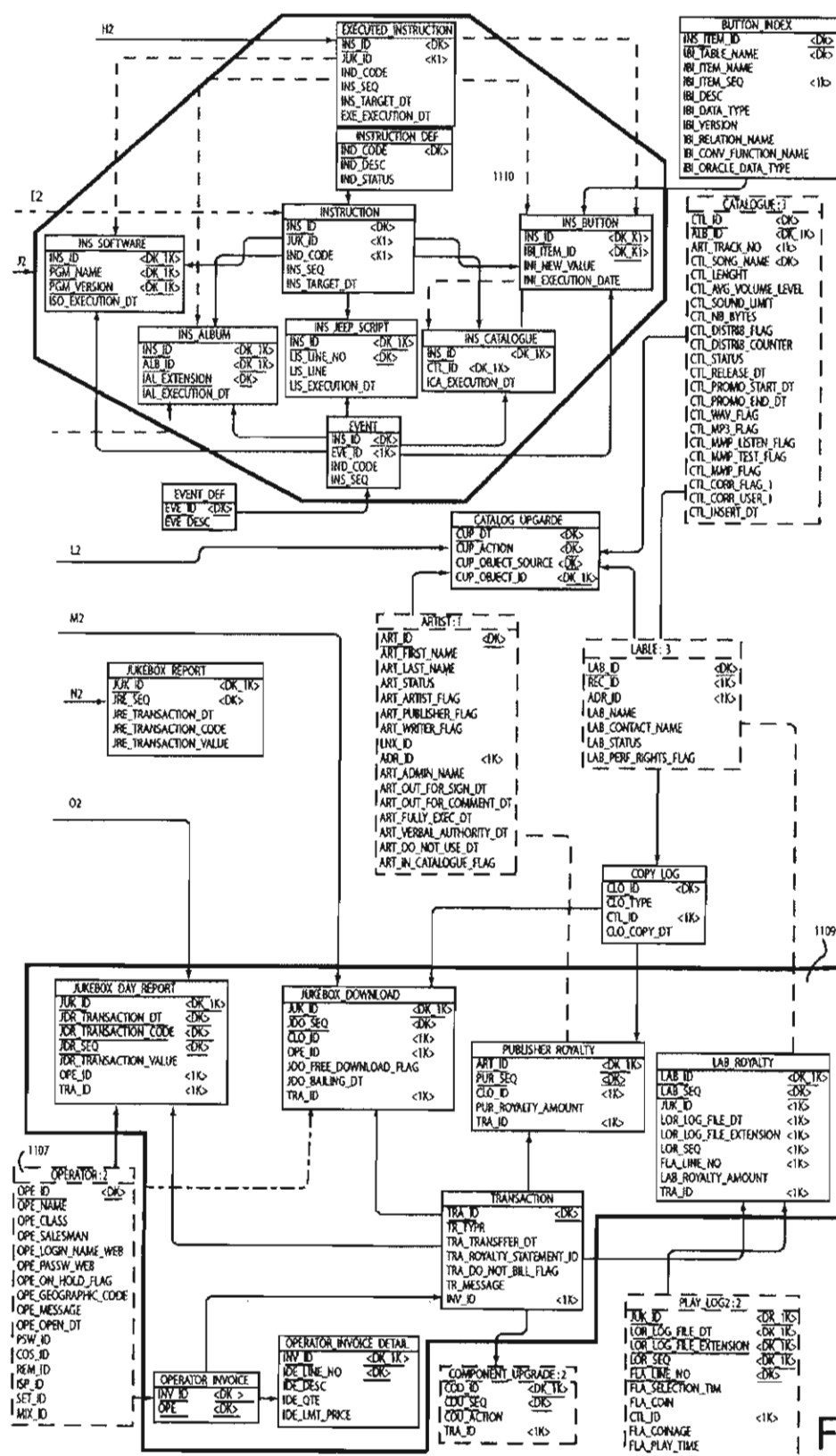


Fig. 3F

U.S. Patent

Jun. 10, 2003

Sheet 9 of 14

US 6,578,051 B1

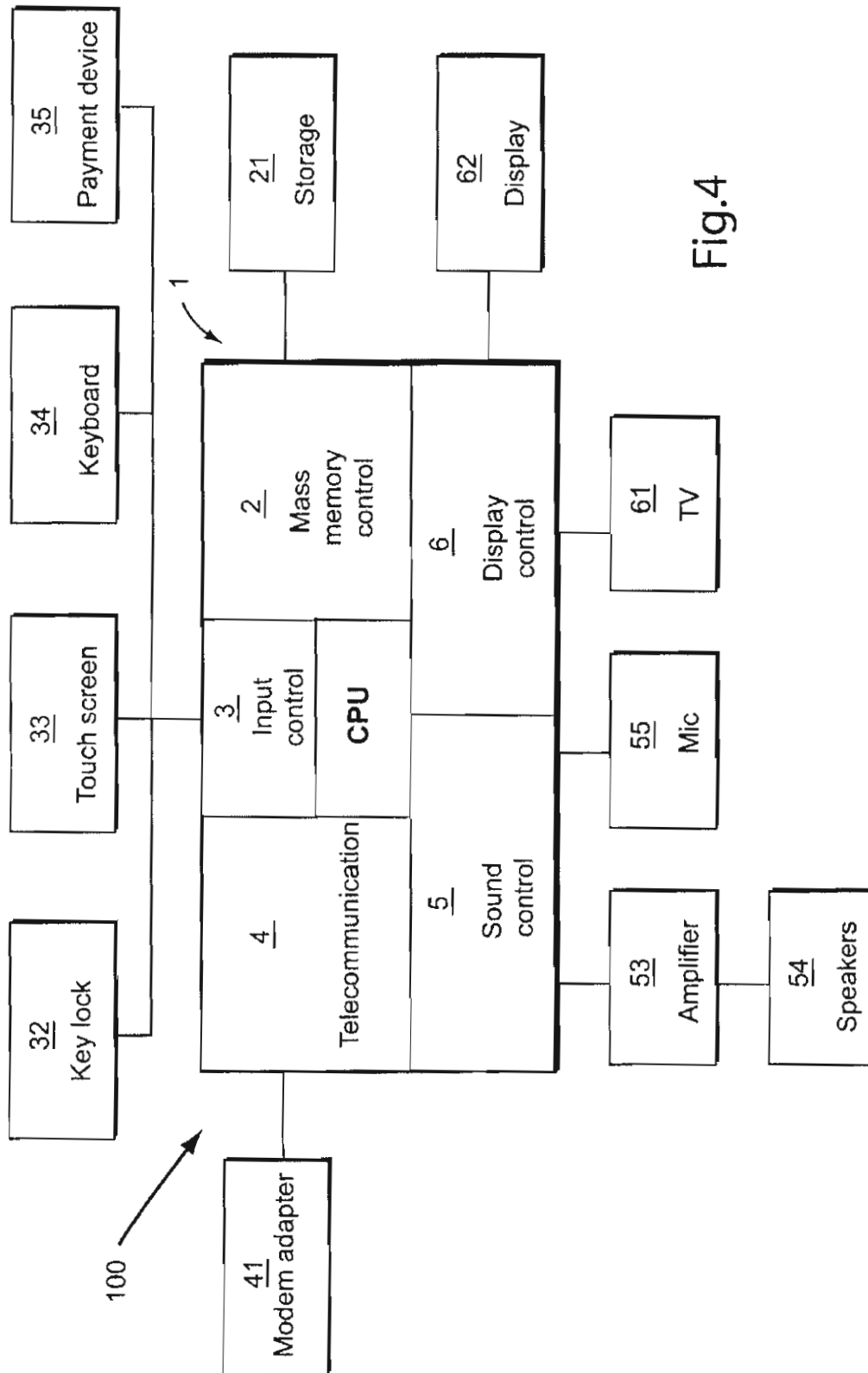


Fig.4

U.S. Patent

Jun. 10, 2003

Sheet 10 of 14

US 6,578,051 B1

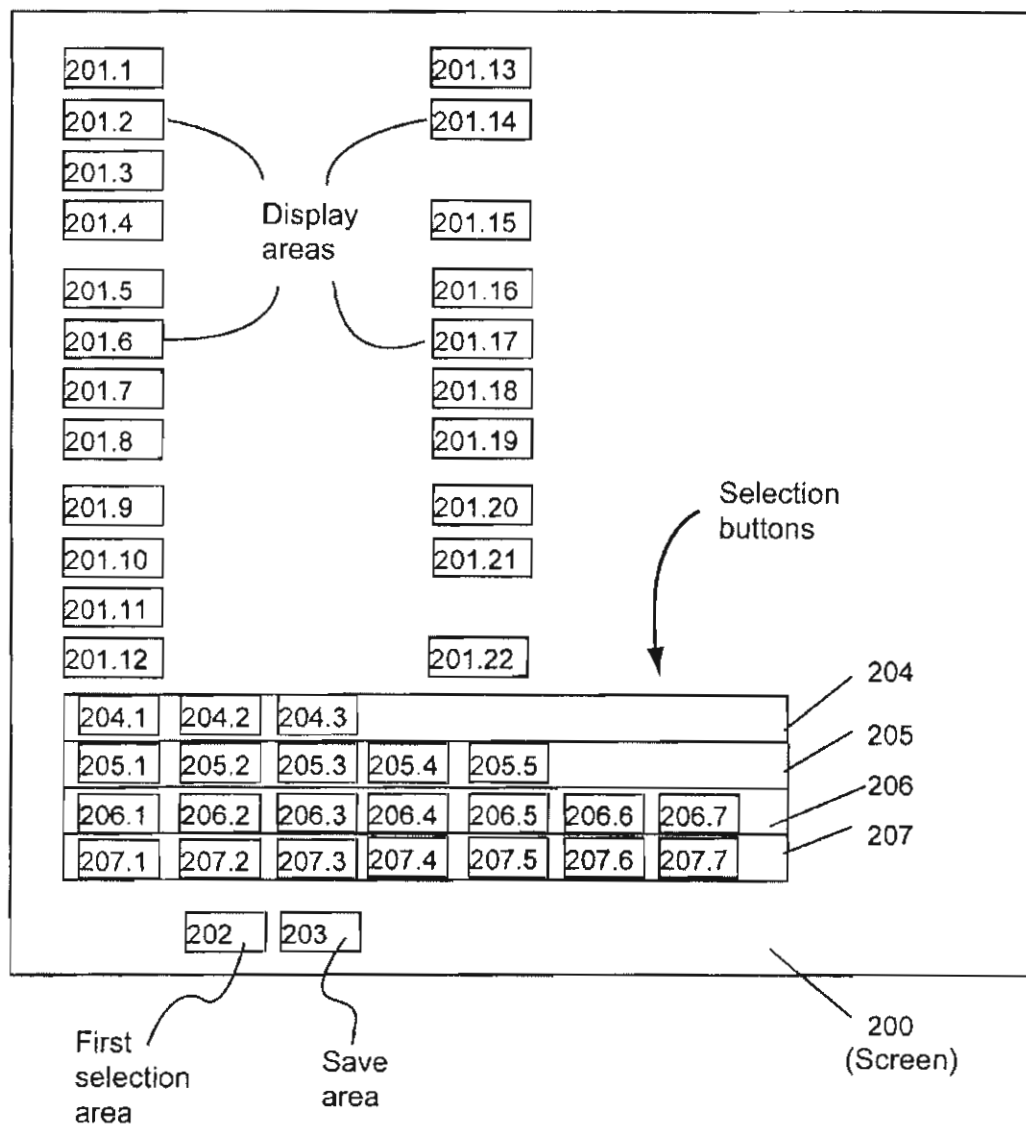


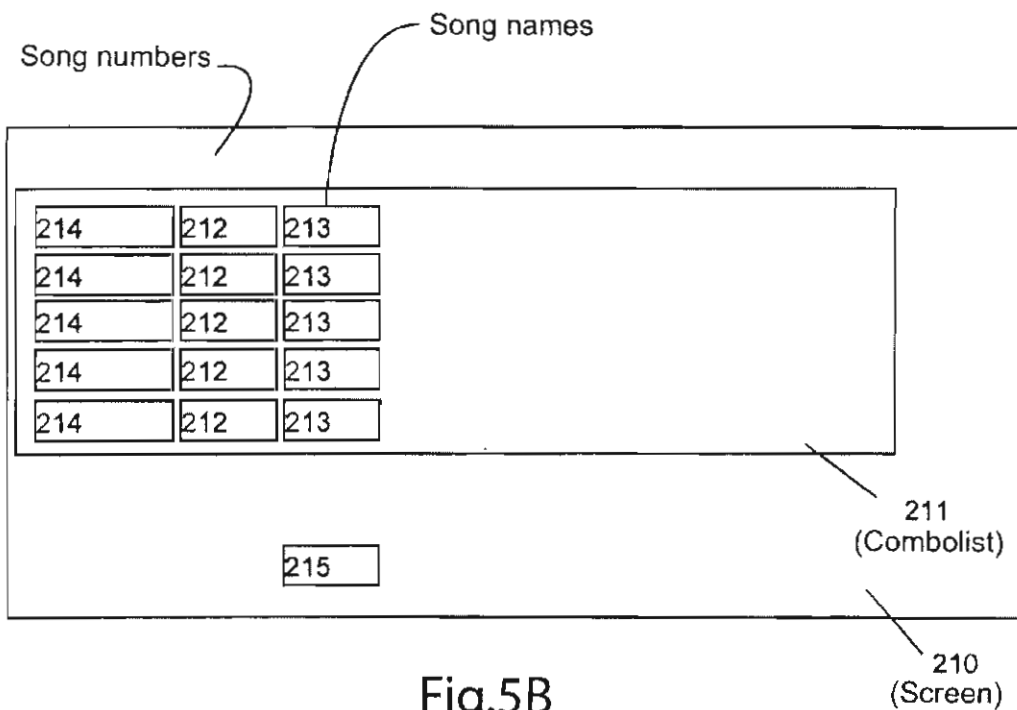
Fig.5A

**U.S. Patent**

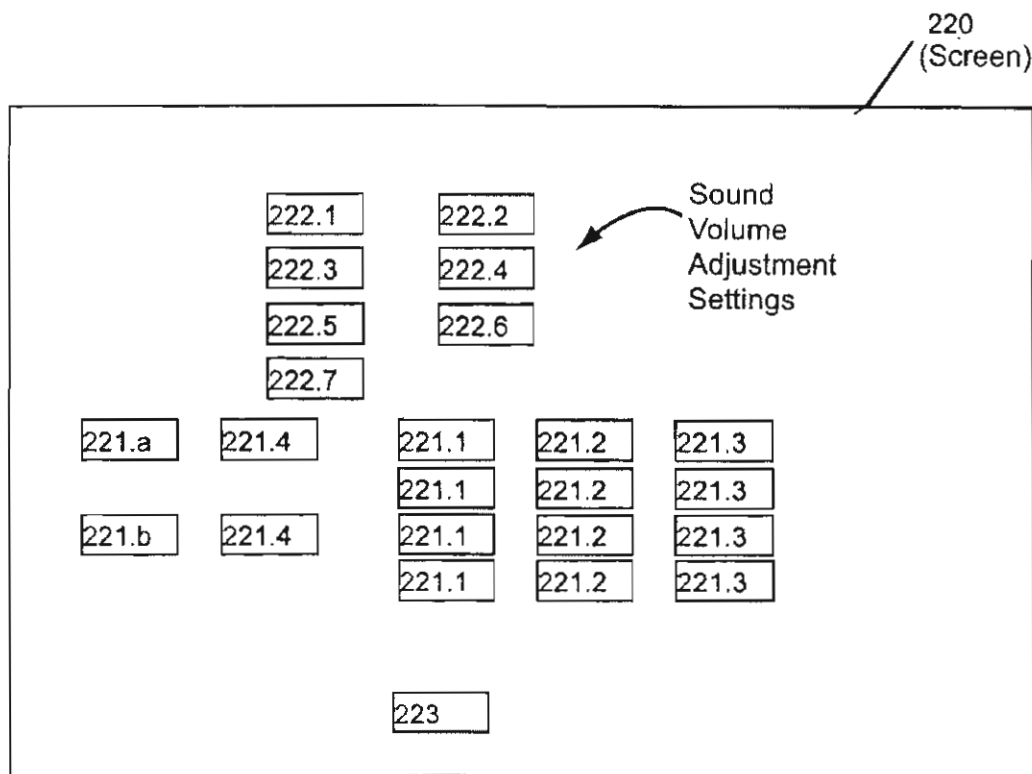
Jun. 10, 2003

Sheet 11 of 14

**US 6,578,051 B1**



**Fig.5B**



**Fig.5C**

U.S. Patent

Jun. 10, 2003

Sheet 12 of 14

US 6,578,051 B1

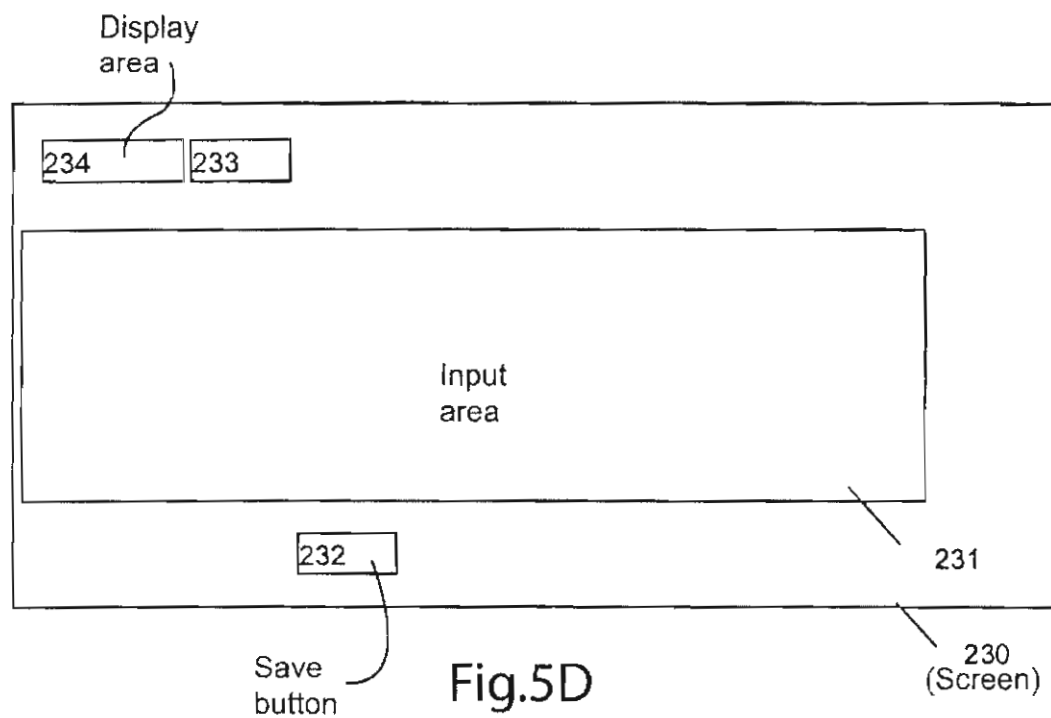


Fig. 5D

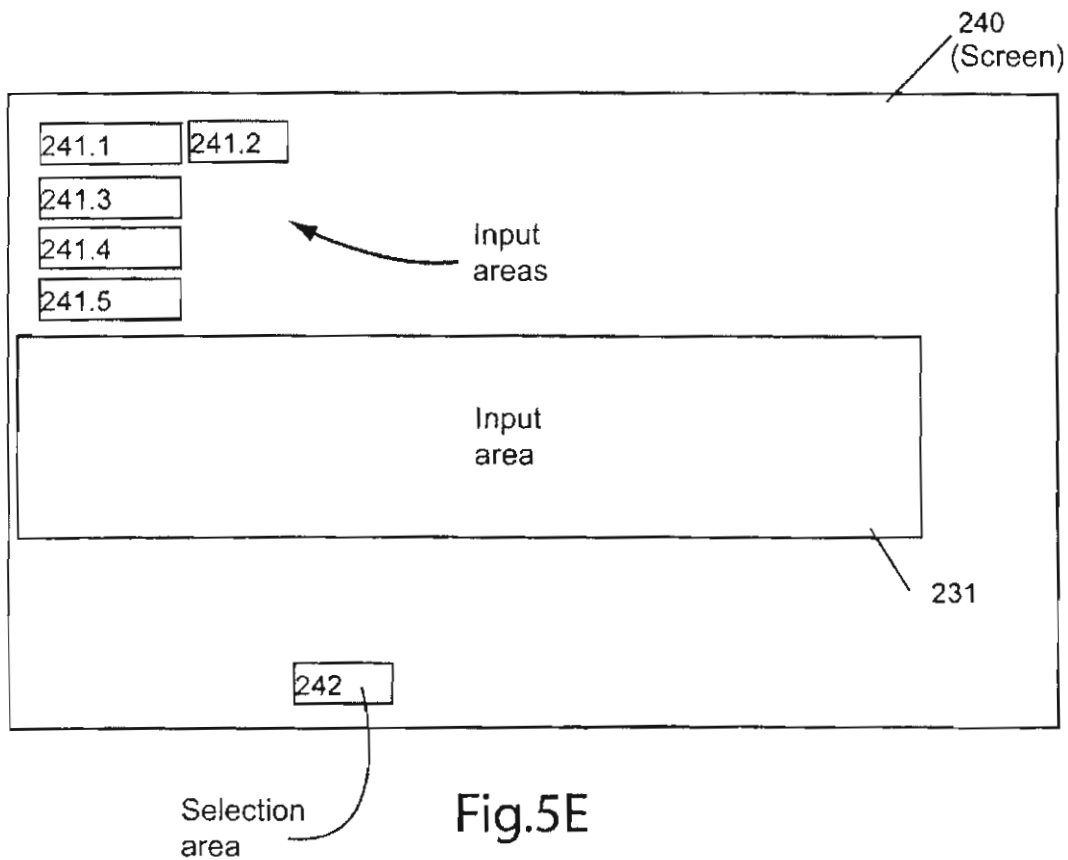


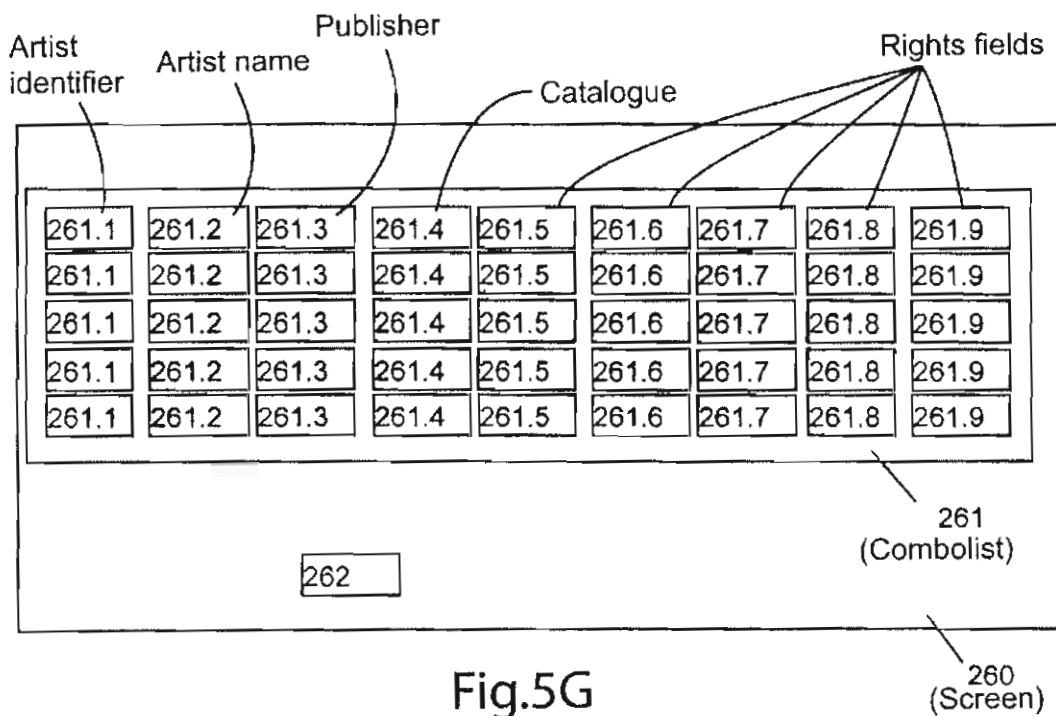
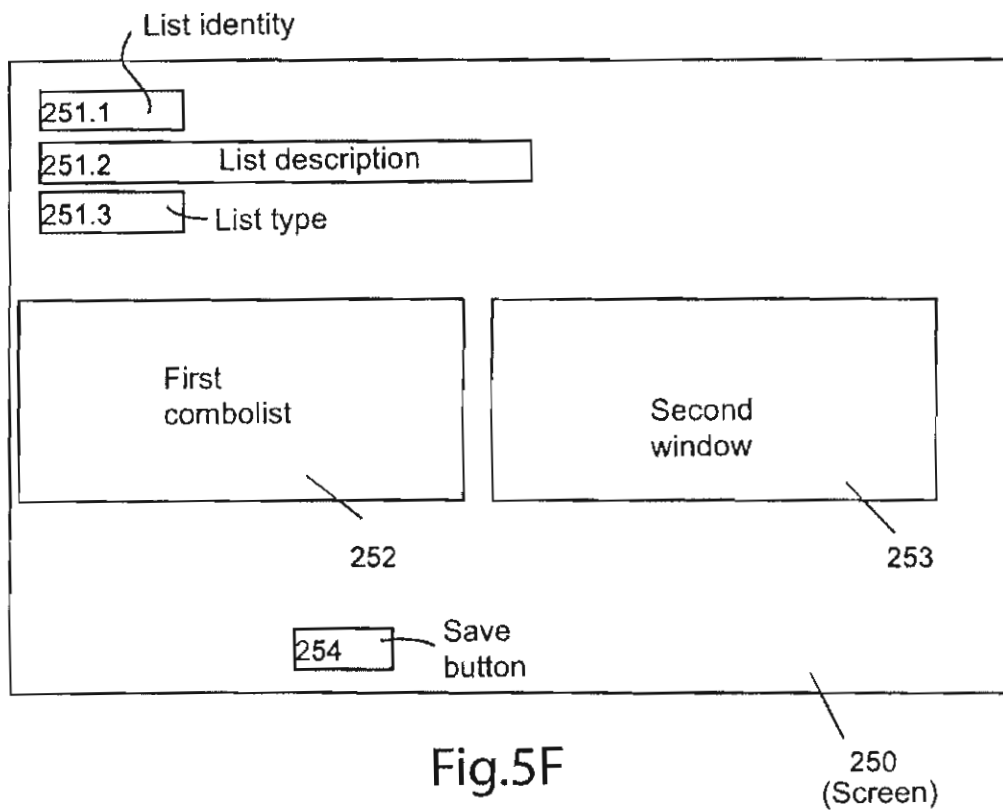
Fig. 5E

U.S. Patent

Jun. 10, 2003

Sheet 13 of 14

US 6,578,051 B1





U.S. Patent

Jun. 10, 2003

Sheet 14 of 14

US 6,578,051 B1

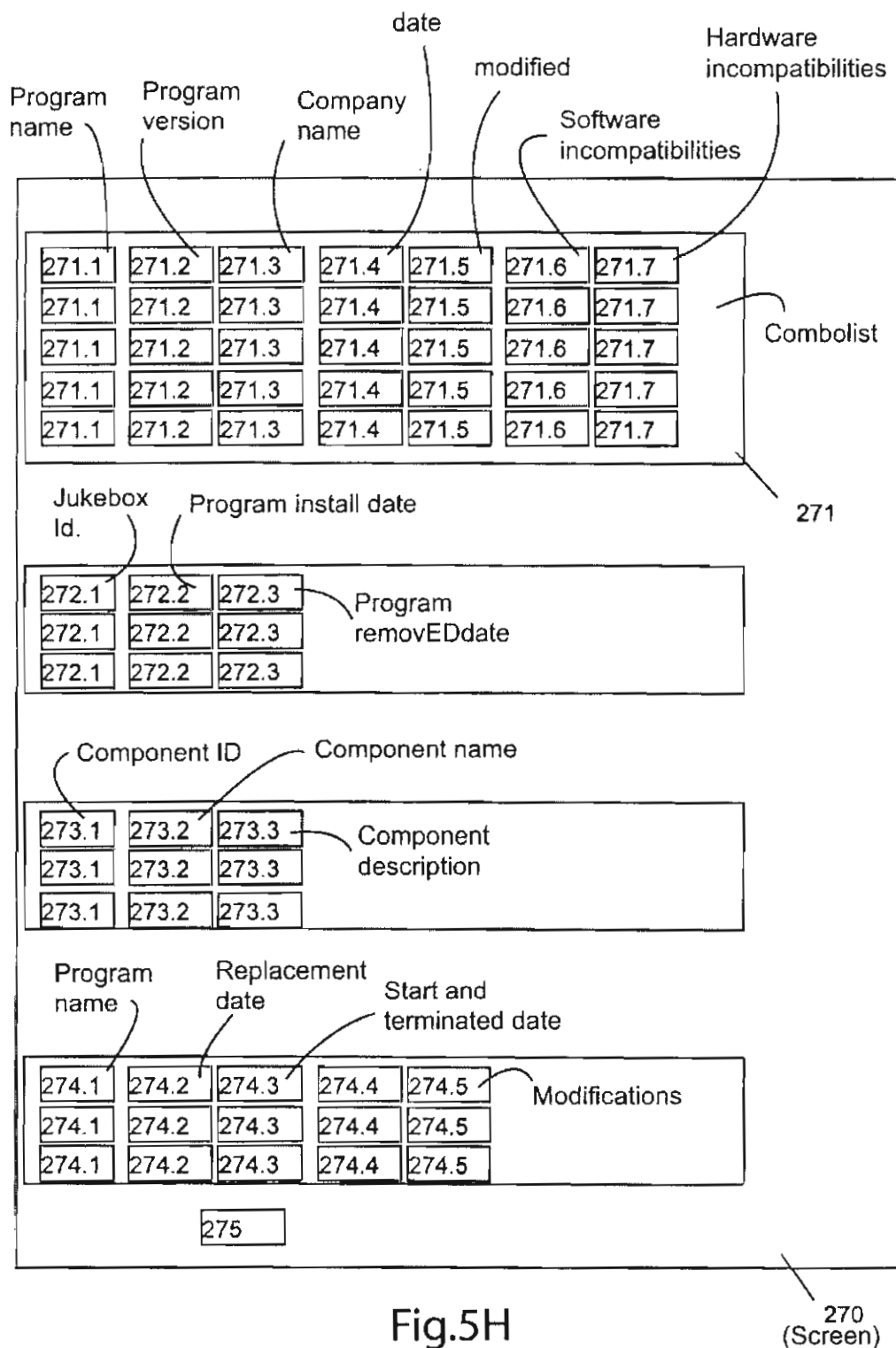


Fig.5H

US 6,578,051 B1

1

# DEVICE AND PROCESS FOR REMOTE MANAGEMENT OF A NETWORK OF AUDIOVISUAL INFORMATION REPRODUCTION SYSTEMS

## FIELD OF THE INVENTION

This invention relates to a device and a process for the management of a network of audiovisual information reproduction systems.

## BACKGROUND OF THE INVENTION

International patent application WO 96/12255 describes a device for reproduction of audiovisual information commonly called jukebox. This jukebox is organized around a system unit that manages audiovisual reproduction means and means for memorizing at least one audiovisual information corresponding at least to the sound reproduction of one song. The system unit also manages telecommunication means such as a modem, particularly to enable downloading of audiovisual information from a host server. Management of orders for new songs and for changing settings requires either that an operator should visit the site on which the jukebox is installed, or that the operator should use a computer with a link to the host server. Furthermore, management operations that can be performed through the link with the host server are limited to ordering new musical selections.

## OBJECT AND SUMMARY OF THE INVENTION

Therefore, the purpose of this invention is to overcome the disadvantages of prior art by proposing a device for management of audiovisual information reproduction systems that can be used to manage all information related to audiovisual information reproduction systems and their operation in a simple and centralized manner.

This purpose is achieved by the fact that the device for management of a network of audiovisual information reproduction systems is characterized in that it comprises a database with a plurality of sets of arrays, each array containing grouped information either about the composition of a jukebox, or the use of the jukebox, or the payment of fees, the database is managed by a computer server provided with means of connection with audiovisual information reproduction systems to firstly receive messages sent by each audiovisual information reproduction device and containing information necessary to update determined sets of arrays in the database, and secondly to send messages to each audiovisual information reproduction device in order to update data or the program for each audiovisual information reproduction device with information stored in at least one set of arrays in the database and transmitted in this message.

According to another feature, a first set of arrays comprises general information about the operating status of the jukebox.

According to another feature, the first set of arrays comprises a number uniquely identifying each jukebox, the operating status of the jukebox, the password authorizing operation of the jukebox and the jukebox installation date.

According to another feature, a second set of arrays in the database comprises information about the hardware and software composition of each jukebox.

According to another feature, the second set of arrays comprises a group of tables containing all software that can be used on the jukeboxes, each program being identified by at least its name and its version number.

2

According to another feature, the second set of arrays comprises a group of tables containing the program names and versions installed on each jukebox, for each given jukebox.

According to another feature, the second set of arrays comprises a group of tables containing the list of hardware components usable in each jukebox, each component being identified by a number, the group of tables also comprising an argument corresponding to the number of the jukebox on which the component is installed.

According to another feature, the second set of arrays comprises a group of tables containing the descriptions of each software and/or a group of tables listing incompatibilities between the software and/or a group of tables containing descriptions of each hardware component, and/or a group of tables listing incompatibilities between components and software, and/or a group of tables containing the list of software associated with hardware components.

According to another feature, a third set of arrays comprising a first subset contains all possible values for the different operating and setting parameter sets for all jukeboxes, each value for a parameter set being identified by a unique number.

According to another feature, a second subset of the third set of arrays associates an identifier of the operating and setting parameter set contained in a group of tables in the first subset of the first group, for each jukebox identifier.

According to another feature, the parameter sets contain the different possible passwords in a first group of tables and/or the prices of songs in a second group of tables and/or the setting of a remote control of a jukebox in a third group of tables and/or the number of free songs usable in a third group of tables and/or Internet connection elements in a fourth group of tables.

According to another feature, a fourth set of tables determines the list of song numbers available on a jukebox with a given identifier number.

According to another feature, a fifth set of arrays comprises a description of all songs, artists and albums making up a bank of songs in the database, each song being identified by a number.

According to another feature, the fifth set of arrays comprises a group of tables containing a description of each song in the songs bank and whether or not it is available on each jukebox, a group of tables containing a description of each album in the songs bank and whether or not it is available on each jukebox, and a group of tables containing a description of each artist or group of artists in the songs bank.

According to another feature, a sixth set of arrays comprises information about the placement of a filter on each jukebox to prevent downloading of at least one song chosen by an operator.

According to another feature, the sixth set of arrays comprises a plurality of groups of tables that define all criteria for all filters that may be setup on each jukebox and applicable to at least one determined artist and/or at least one determined songs category and/or at least one determined disk publisher and/or at least one determined song, each filter being described in an array and identified by a unique number identifying the filter.

According to another feature, the first set of arrays comprises an argument corresponding to the identifier of the filter(s) applied to the determined jukebox.

According to another feature, a seventh set of arrays comprise information about operators that own or rent each jukebox.

US 6,578,051 B1

3

According to another feature, an eighth set of arrays comprises the history of the use of each jukebox.

According to another feature, the eighth set of arrays comprises a group of tables containing the list of all identifiers of songs distributed on each audiovisual information reproduction device, this array being updated by the server on reception of a report file, by a determined audiovisual information reproduction device, and containing the list of songs distributed on the jukebox.

According to another feature, a ninth set of arrays comprises information necessary for the calculation of fees and the rental cost for each jukebox.

According to another feature, a tenth set of arrays comprises all instructions intended to update at least one audiovisual information reproduction device, these instructions being transmitted to the audiovisual information reproduction device concerned by the server as soon as the audiovisual information reproduction device sets up a communication with the server.

According to another feature, the tenth set of arrays comprises a group of tables identifying update instructions for a determined jukebox and the order in which the instructions must be executed on the jukebox and/or the date starting from which the server can transmit instructions to the jukebox.

According to another feature, the instructions contained in the eleventh set of tables are memorized before the date starting from which the server can transmit instructions to the jukebox.

According to another feature, the tenth set of arrays comprises a plurality of groups of tables containing update instructions possible on each jukebox, each instruction related either to an update to the software, or the addition of a new album, or the addition of a new song, or the management of computer files on a jukebox, or the modification of a jukebox operating parameter.

According to another feature, the tenth set of arrays comprises a group of specific tables comprising all identifiers of instructions that were correctly transmitted to each jukebox, the group of specific tables also comprises at least the destination jukebox identifier and the instruction transmission date, for each instruction identifier.

According to another feature, the tenth set of arrays comprises at least one group of specific tables defining events triggering a given instructions group.

According to another feature, a first subset of an eleventh set of arrays comprises information about setting up a promotion for the distribution of at least one song available on each jukebox, each promotion being identified by a number, and in that a second subset of the eleventh set of arrays comprises references of the promotion(s) applicable to a given jukebox.

According to another feature, the first subset of the eleventh set of arrays comprises at least one group of specific tables defining all songs for which there is a promotion, and the promotion start and end dates, and the first subset of the eleventh set of arrays also comprises a group of specific tables comprising price modifications of the songs for which the promotion is made.

According to another feature, payment of fees due for the distribution of all songs included in the promotion is charged to the promoter who initiated the promotion.

According to another feature, the server comprises a module for the display of information in the database in order to display at least one screen comprising at least one

4

information display area and/or at least one information input area and/or at least one information selection area, each selection area provokes the collection of information by the server in the database or validation of information contained in each input area and each display area includes the value of an argument in the database.

A second purpose of the invention is to propose a process for the management of a network of audiovisual information reproduction systems or jukebox.

This second purpose is achieved by the fact that the process for the management of a network of audiovisual information reproduction systems or jukebox comprises a computer server with means of connection to information reproduction systems, characterized in that it comprises:

- a step in which a jukebox is connected to the server to setup a communication,
- a step with transfers of at least one message from the jukebox to the server,
- a step in which the server processes the message to identify the jukebox that setup a communication and to update at least one table in a database controlling central management of the jukeboxes,
- a step to search for instructions to update the jukebox, in at least one group of tables in the database,
- a step for the construction of a message and then transfer of the message from the server containing the update instructions found in the database, to the jukebox that setup the communication.

#### BRIEF DESCRIPTION OF DRAWINGS

Other features and advantages of this invention will become more obvious after reading the following description with reference to the attached drawings in which:

FIG. 1 shows a block diagram of a system using a server according to the invention,

FIG. 2 shows a simplified flow chart of the structure of a database of the server used by the system according to the invention,

FIGS. 3A to 3F show a detailed flow chart of the structure of a database used by the system according to the invention,

FIG. 4 shows an example of an audiovisual reproduction device,

FIGS. 5A to 5H show different arrays used to display information in the database.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Before describing details of the remote management system for an audiovisual reproduction device according to the invention, it is worth mentioning the composition of an audiovisual reproduction device and its operating mode.

FIG. 4 shows an example of an audiovisual information reproduction device. This type of device is described in particular in international patent application WO 96/12255 submitted by the applicant. Preferably, but in no way restrictively, this audiovisual information reproduction device uses the hardware components mentioned and referenced below.

The system unit 1 with a microprocessor is a high performance PC compatible system, the choice at the time of implementation was made for an Intel Pentium type system with at least the following memory means and characteristics:



US 6,578,051 B1

5

compatibility with the Vesa local bus,  
processor cache memory: 256 kbytes,  
RAM memory: 32 Mbytes,  
high performance serial and parallel ports,  
microprocessor controlled SVGA type graphic adapter,  
SCSI/2 type bus controller,  
self-powered static RAM memory.

Any other system unit with equivalent or better performances could be used in the invention.

This system unit controls and manages a sound control circuit 5, a telecommunications control circuit 4, an input control circuit 3, a mass memory control circuit 2, and a display means 62 control circuit 6. The display means are composed primarily of a SVGA type flat screen, high resolution, low radiation video monitor 62 with no interlacing. This is the monitor that will be used for image reproduction (for example album covers for musical selections), and to display graphics and video clips.

Storage modules 21 using high speed, high capacity SCSI type hard disks form part of the memory means and are associated with the memory means already existing in the microprocessor device. These modules are used for the storage of audiovisual information.

A 28.8 kbps high speed telecommunications modem adapter 41 is included to create the link with an audiovisual information distribution network controlled by a host server.

For the reproduction of audio information in musical selections, the system comprises loudspeakers 54 into which the signal from an amplifier tuner 53 connected to a music synthesizer type electronic circuit 5 is input, designed to accept a large number of input sources while providing a CD (compact disk) type quality output, for example such as the microprocessor multimedia audio adapter such as a sound card.

The audiovisual reproduction device is provided with an input controller circuit 3 that manages a touch screen 33 including a glass coating panel using the "advanced surface wave technology", and an AT type bus controller. This touch screen placed in front of the monitor can be used to select various selection information used by customers, and ordering and management control information used by the system manager or owner, on the video monitor display 62 or on a television screen 61. It is also used with an external keyboard 34 that can be connected to the system that is provided with a keyboard connector for this purpose, controlled by a key lock 32 through the interface circuit 3, for maintenance purposes.

A fee payment device 35 is also connected to the input interface circuit 3. Any other device can be used that enables reception of any payment method by coins, tickets, tokens, magnetic cards or smart cards or a combination of payment means.

The system is installed in a steel frame or rack.

Apart from these elements, a cordless microphone 55 is connected to the audio controller 5, to transform the audio controller into a powerful public address and public information system, and possibly a karaoke machine. The system can use a system of cordless loudspeakers.

The audiovisual information reproduction device also comprises an integrated circuit (not shown), electrically powered only when a read or write operation is carried out, and capable of storing the serial number in a nonvolatile memory. The operating system can read or write information on the circuit through a control circuit, particularly to keep the jukebox serial number and the different operating parameters. This circuit is called an "Ibutton" in prior art.

6

The operating software in the system was generated around a library of tools and services specifically designed for the audiovisual field in a multimedia universe. This library advantageously includes a high performance multi-task operating system that efficiently enables simultaneous execution of multiple code fragments. This operating software enables concurrent and orderly execution, thus avoiding any conflict between operations carried out on display means, audio reproduction means and management of telecommunication links through the distribution network. Furthermore, this software is extremely flexible.

Throughout the rest of this description, the terms "audiovisual information reproduction device" and "jukebox" refer to the same object.

FIG. 1 shows a block diagram of the device according to the invention. According to prior art, each audiovisual reproduction device (100.1 to 100.n) communicates with the host server 10 through its telecommunication means, and for example a modem card 41 connected to the telephone network 30. The host server 10 comprises communication means 121, 111 for this purpose, for example such as at least one modem connected to the telephone network. The host server 10 also comprises a database 11 containing all information about the operation of each audiovisual information reproduction device (100.1 to 100.n), in other words the operating parameters for the audiovisual information reproduction device (100.1 to 100.n), its identification number, the list of songs stored on each audiovisual information reproduction device (100.1 to 100.n), each operator being responsible for management of one group of audiovisual information reproduction device(s) (100.1 to 100.n). The database also contains statistics about the use of each audiovisual information reproduction device (100.1 to 100.n), in other words the list of songs played and the date on which each song was played, the list and date of all incidents that occurred during the use of each audiovisual information reproduction device (100.1 to 100.n), particularly when it was switched off, communication interruptions, and the number of times that payment means refused the money input or the proposed payment. Similarly, the database comprises the list of available songs stored in the host server memory means 10, the audiovisual information necessary for reproduction of these songs, and the setting tools necessary to install the operating system for each audiovisual information reproduction device (100.1 to 100.n). All the information contained in the database 11 is updated by means of communications, for example periodic communications, with each audiovisual information reproduction device (100.1 to 100.n) through the telephone network and modems for each audiovisual information reproduction device (100.1 to 100.n) and the database or the host server 10.

An example database 11 used in the device according to the invention will now be described with reference to FIGS. 2 and 3A to 3F. All this information in the database 11 is stored in the form of arrays. Each array contains information about a theme or structure or particular function of the audiovisual information reproduction systems (100.1 to 100.n, FIG. 1). Each item of information is identified by an argument contained in an array in the database 11. The information in one array may be linked to another array. This link is established when at least one argument is common to the two arrays.

According to the invention, the database 11 comprises at least one first set of arrays (1101, JUKEBOX, FIGS. 2 and 3A and 3E) representing information directly concerning the audiovisual information reproduction device (100.1 to

US 6,578,051 B1

7

100.n, FIG. 1), for example such as its operating status (JUK\_STATUS, FIG. 3A), its identification number (JUK\_ID, FIG. 3C), or the available memory space (JUK\_AVAILABLE\_SPACE, FIG. 3A). Each table in this first set of arrays 1101 represents an audiovisual information reproduction device (100.1 to 100.n, FIG. 1) identified in this table by its identification number (JUK\_ID, FIG. 3A). Similarly, the information contained in the table in the first set of arrays (1101, FIG. 3A) can be updated when a message is received from a jukebox. This is done by the jukebox, as soon as it sets up communication with the server (10, FIG. 1) processing the received message to see if the information contained in the database needs to be updated. If the message contains information about changes to the jukebox status, the server modifies the argument of the table in the first set of arrays (1101, FIG. 3A) of the jukebox concerned by the received changes.

This first set of arrays (1101, FIG. 3A) is related to at least one second set of arrays (1102, SOFTWARE, FIRMWARE, COMPONENT, FIGS. 3B and 3D) representing information about hardware and software constituents that can be encountered on an audiovisual information reproduction device (100.1 to 100.n, FIG. 1). The arrays in the second set of arrays (1102, FIGS. 3B and 3D) comprise in particular the name (PGD\_NAME, COD\_ID, FIG. 3B), the version (PGM\_VERSION, FIG. 3B) and the installation date (PGM\_RELEASE\_DT, FIG. 3B) of each software or hardware component, in the array (SOFTWARE, FIG. 3B). Each row in the second arrays (1102, FIGS. 3B and 3D) corresponds to a software component or a hardware component. The link between at least one table in the second set of arrays (1102, FIGS. 3B and 3D) and a table in the first set of arrays (1101, FIGS. 3A and 3E) is made using the number of the audiovisual information reproduction device (100.1 to 100.n, FIG. 1). Thus using this link, it is possible to the server to know all software and hardware components of an audiovisual information reproduction device (100.1 to 100.n, FIG. 1) with a given number by searching in each second array for the rows containing the identification number of the audiovisual information reproduction device number (100.1 to 100.n).

The first set of arrays (1101, FIGS. 2 and 3A and 3E) is also related to a third set of arrays (1103, JUKE\_XXX, IB\_XXX, FIGS. 3A and 3C) representing information about the setting of an audiovisual information reproduction device (100.1 to 100.n, FIG. 1). A first group of arrays in the third set of arrays (1103, IB\_XXX, FIGS. 3A and 3C) contains all operating parameters for the audiovisual information reproduction systems (100.1 to 100.n, FIG. 1) and a second group of arrays in the third set of arrays (1103, JUK\_XXX, FIGS. 3A and 3C) associates each jukebox with a given set of parameters contained in a group of arrays in the third set of arrays (1103, IB\_XXX, FIGS. 3A and 3C). Operating parameters include parameters controlling the volume of the amplifier defined for a jukebox in the tables (JUK\_MIXAGE, FIG. 3A), or the parameters defined for the same jukebox in the I-button tables (IB\_MIXAGE, FIG. 3A) table, or parameters about the price to be paid (IB and JUK\_TUNE\_COST) to select at least one song, or telecommunication link parameters (JUK\_ISP) with the server (10, FIG. 1), or operating parameters for a remote control if any for an audiovisual information reproduction device (100.1 to 100.n, FIG. 1). These parameters are defined for a jukebox in the (JUK\_REMOTE\_CONTROL, FIG. 3C) table and all remote control operating parameters for all jukeboxes are defined in the (IB\_REMOTE\_CONTROL, FIG. 3C) table, an audiovisual information reproduction

8

device (100.1 to 100.n, FIG. 1) being associated each time with a table (JUK\_TUNE\_COST, IB\_TUNE\_COST, JUK\_REMOTE\_CONTROL, IB\_REMOTE\_CONTROL, FIG. 3C) in the third set of arrays (1103, FIGS. 3A and 3C). Each row in a table stores operating parameters for an audiovisual information reproduction device (100.1 to 100.n, FIG. 1) with a given number (JUK\_ID, FIGS. 3A and 3C). The link between the first and third sets of arrays (1103, FIGS. 3A and 3C) may be made for example using the identification number of an audiovisual information reproduction device (100.1 to 100.n, FIG. 1). Thus, the server 10 can find all operating parameters of an audiovisual information reproduction device (100.1 to 100.n, FIG. 1) with a given number by using this link, by searching in each third set of arrays (1103, FIGS. 3A and 3C) for tables containing the number (JUK\_ID, FIGS. 3A and 3C) of the determined audiovisual information reproduction device (100.1 to 100.n, FIG. 1), then searching in the rows of these tables for the set of parameters corresponding to the found reference. Similarly, the server can update the information contained in the third set of arrays (1103, FIGS. 3A and 3C) when a message is received from a jukebox. This is done by the server processing the received message immediately that a jukebox enters into communication with the server, in order to determine if the information contained in the database needs to be updated. If the message contains information about modifications to physical parameters, the server adds a new table or replaces the value supplied by the modifications in the row of the table concerned in the third set of arrays (1103, FIGS. 3A and 3C).

The first set of arrays (1101, FIGS. 2, 3A and 3E) is also related to at least a fourth set of arrays (1104, SONG, FIGS. 2 and 3A) representing information about songs downloaded on the audiovisual information reproduction systems (100.1 to 100.n, FIG. 1). Each song is identified by a unique number (CLT\_ID, FIGS. 2 and 3A). Each row in a table in the fourth set of arrays (1104, FIGS. 2 and 3A) represents a song stored on the audiovisual information reproduction device (100.1 to 100.n, FIG. 1) identified by its identifier at the beginning of the table. The jukebox periodically (for example daily) sends a message to the server. This message contains the list of all songs installed on the jukebox. Thus, the server compares the list that it receives from the previous list that it had received from the same jukebox and checks if there are any new songs. If there are, the server adds a table corresponding to the addition of one or more new songs in the list of songs available on the jukebox.

A fifth set of arrays (1105, CATALOGUE, FIGS. 2 and 3B) related to the fourth set of arrays (1104, SONG, FIGS. 2 and 3A) through the song identification number (CLT\_ID, FIGS. 2 and 3A), comprises a description of each song in the database. Each row in the fifth array (1105, FIGS. 2 and 3B) represents the description of a song in the database (11, FIG. 1). This fifth set of arrays (1105, FIGS. 2 and 3B) in particular is used to determine whether or not a song is available to be downloaded on an audiovisual information reproduction device (100.1 to 100.n, FIG. 1) at the request of an operator. In particular, a song is not available unless agreements have been made about copying and playing the song. If these agreements have not been made, the song is present in the database but is not available for downloading to a jukebox. The link between the first set of arrays (1101, FIGS. 2 and 3A) and the fourth set of arrays (1104, FIGS. 2 and 3A) is made through the identification number (JUK\_ID, FIG. 3A) of the audiovisual information reproduction device (100.1 to 100.n, FIG. 1).

The fourth set of arrays (1104, FIGS. 2 and 3A) is also related to a sixth set of arrays (1106, FIGS. 2 and 3B)



US 6,578,051 B1

9

representing information about filters that an operator can use to prohibit downloading one or a plurality of songs determined by groups of specific tables. The song (or songs) is identified by a first group of specific tables identified by the identification number of the song(s) (FLT\_CATALOGUE, FIGS. 2 and 3B), or by a second group of specific tables identified by the artist's identification number of the song(s) (FLT\_ARTIST, FIGS. 2 and 3B), or a third group of specific tables identified by the identification number of the company that published the song(s) (FLT\_LABEL, FIGS. 2 and 3B), or by a fourth group of specific tables identified by the identification number of the category (FLT\_CATEGORY, FIG. 3B) to which the song(s) belong. Each group of tables in a sixth set of arrays (1106, FIGS. 2 and 3B) represents a given filter for a song, an artist, a disk publisher or a category. One of the tables (JUK\_FILTER, FIGS. 2 and 3B) in the sixth set of arrays (1106, FIGS. 2 and 3A) is also linked to the first set of arrays (1101, FIG. 3A) and comprises the description (JUK\_DESC, FIG. 3B) of the filter assigned to each jukebox by the filter identification number (JUF\_ID) that is associated with the given jukebox identifier (JUK\_ID) in each table (JUKEBOX, 1101, FIG. 3A). The first array (1101, FIG. 3A) also includes an argument corresponding to the filter number (JUF\_ID). Thus, the filter on a given jukebox is defined by searching in the sixth set of arrays (1106, FIGS. 2 and 3B) for the table(s) containing the filter number (JUF\_ID). Similarly, an operator can assign the same filter number to one or a plurality of audiovisual information reproduction systems (100.1 to 100.n, FIG. 1).

The first array (1101, FIGS. 3A and 3E) is also related by the identifier (JUK\_ID) to a seventh set of arrays (1107, JUKE\_LOCATION, FIG. 3A) representing information about the operators of audiovisual information reproduction systems (100.1 to 100.n, FIG. 1). This information comprises in particular an operator identifier (OPE\_ID, FIG. 3A) that accesses a table (OPERATOR, FIG. 3A) specific to each operator. Each array (WAREHOUSE, ADDRESS, CONTRACT, FIG. 3A) in the seventh set of arrays (1107, FIG. 3A) corresponds to a table associated with a given operator. The relation between the first array (1101, FIG. 3A) and the seventh array (1107, FIG. 3A) is made through the operator identifier (OPE\_ID). In order to achieve this, the first array (1101, FIG. 3A) therefore includes an argument (JUK\_ID) used to find the associated argument (OPE\_ID) corresponding to the owner or renter operator of the audiovisual information reproduction device (100.1 to 100.n, FIG. 1) in the jukebox locating table (JUKE\_LOCATION, FIG. 3A). Thus, in particular this relation enables the server to determine the numbers of the audiovisual information reproduction devices (100.1 to 100.n, FIG. 1) managed by the operator for a given operator number. The (JUKE\_LOCATION, FIG. 3A) table in the seventh set of arrays (1107, FIG. 3A) also includes the date (JUL\_START\_DT) on which the jukebox was installed for rental in the installation premises, and the expiration date of the rental.

The first set of arrays (1101, FIGS. 2 and 3A and 3E) is also related to an eighth set of arrays (1108, FIGS. 3A and 3E) representing information about the log for an audiovisual information reproduction device (100.1 to 100.n, FIG. 1). This information actually represents all events that take place on each audiovisual information reproduction device (100.1 to 100.n, FIG. 1) and in particular, every time that a song is played, a row is written in a table in the eighth set of arrays (1108, PLAY\_LOG, FIG. 3A). Similarly, every time that an amount of money is inserted into the audiovisual

10

information reproduction device (100.1 to 100.n, FIG. 1), a new row is written, for example in another array of the same type (SYSTEM LOG, FIG. 3A). In particular, the information collected in these arrays is used to calculate fees to be paid to the artists or publishers or writers of the played songs, and also to find out exactly what songs were played during a day, a week or a given period, on a determined audiovisual information reproduction device (100.1 to 100.n, FIG. 1).

For example, information about the fee calculations may be centralized in a ninth set of arrays (1109, FIG. 3F) comprising groups of tables (JUKE\_DAY\_REPORT, FIG. 3F) related to the eighth set of arrays (1108, FIGS. 3E and 3A). The eighth set of arrays (1108, SYSTEM\_LOG, PLAY\_LOG, FIGS. 3E and 3A) is updated every time that the server receives a log file during a communication setup between the server and a jukebox. Each event contained in the log file transmitted by the jukebox will be processed by the server. This processing consists of adding a row in one of the tables (1108, SYSTEM\_LOG, PLAY\_LOG, FIGS. 3A and 3E) in the eighth set of arrays for each event. For example, events may be sorted into two categories. The first events are songs played on the jukebox and are memorized in the group of arrays (PLAY\_LOG, FIGS. 3A, 3E and 3F), and the second events are other operations that occurred on the jukebox, for example such as insertion of amounts of money in payment means and are memorized in the SYSTEM\_LOG group of arrays, FIGS. 3A and 3E.

Similarly, a copy of a song made on a jukebox will be paid for by the payment of a royalty to the song publisher. In order to do this, the fourth and fifth sets of arrays (1104, 1105 FIG. 3A, FIGS. 3B and 2) comprise all information necessary to determine the number of songs on each jukebox. The fourth set of arrays (SONG, 1104, FIG. 3A) includes the list of all songs stored on each jukebox. A first set of tables (MASTER\_CATALOGUE) is used to determine the list of songs that were initially installed in each jukebox, the fifth set of arrays (CATALOGUE) identifies each song and in particular is used to determine the amount of the royalties for each song and the persons who will receive them. The royalty is then assigned by the use of an array (CONTRACT FIG. 3A) in the seventh set of arrays (1107, FIG. 3A).

Finally, the jukebox operator will be charged a fee for each use of the jukebox. This fixed fee is invoiced using the group of tables (1108, SYSTEM\_LOG, FIGS. 3A and 3E) in the eighth set of arrays. Each table in this group of tables corresponds to an event that occurred on each jukebox. Thus, each time that an amount of money was inserted in a jukebox, another table was added. This eighth set of arrays is related to a group of tables in the ninth set of arrays (1109, JUKEBOX\_REPORT, FIG. 3F) that defines the amount of money added into each jukebox for each day and for each jukebox of an operator. Similarly, the details of operations carried out during the day can be determined for each jukebox through another group of tables in the ninth set of arrays (1109, JUKEBOX\_REPORT, FIG. 3F).

The first set of arrays (1101, FIGS. 2 and 3A and 3E) is also related to at least one tenth set of arrays (1110, INSTRUCTION FIG. 3F) representing information about instructions that will be sent to at least one determined audiovisual information reproduction device (100.1 to 100.n, FIG. 1). At least one group of tables in the tenth set of arrays (1110, INSTRUCTION\_DEF, FIG. 3F) contains a description of the instructions (INS\_DESC, FIG. 3F). Similarly, the relation between the first set of arrays (1101, FIGS. 2, 3A and 3E) and the tenth set of arrays (1110, FIG. 3F) is made using the identification number (JUK\_ID) of the

US 6,578,051 B1

11

audiovisual information reproduction device (100.1 to 100.n, FIG. 1). Thus, all instructions intended for a determined audiovisual information reproduction device (100.1 to 100.n, FIG. 1) can be collected by the server, and downloaded on the identified jukebox, when it sets up communication with the server. For example, these instructions may be an update to at least one software (INS\_SOFTWARE, FIG. 3F) installed on the audiovisual information reproduction device (100.1 to 100.n, FIG. 1), downloading of new songs (INS\_CATALOGUE, INS\_ALBUM, FIG. 3F) ordered by the operator of the audiovisual information reproduction device (100.1 to 100.n, FIG. 1), or a modification of the operating parameters (INS\_IBUTTON) of the audiovisual information reproduction device (100.1 to 100.n, FIG. 1). The group of tables (1110, INSTRUCTION, FIG. 3F) containing the jukebox identification (JUK\_ID) and an identification of the instructions (INS\_ID) to be transmitted to this jukebox is systematically read by the server 10 when an audiovisual information reproduction device (100.1 to 100.n, FIG. 1) sets up a communication with the server 10 in order to verify whether or not the instructions stored in the tenth set of arrays (1110, FIG. 3F) are to be used by the audiovisual information reproduction device (100.1 to 100.n, FIG. 1) that has just set up a communication with the server 10. The link between the different groups of tables in the tenth set of arrays is made using an instruction identification number (INS\_ID). The set of instructions contained in the tenth set of arrays (1110, FIG. 3F) can be prepared and stored in the database before the date on which these instructions are to be applied in practice on the jukebox. These instructions are not actually sent to the jukebox until the required date of application when the jukebox sets up communication with the server 10.

The first set of arrays 1101 is related to at least one eleventh set of arrays (1111, JUKE\_PROMOTION, FIG. 3B) representing information about setting up promotional operations on jukeboxes by JUK\_ID through the (PRICING, FIG. 3B) table that indicates the access argument PRI\_ID to one of the tables in the eleventh set of arrays (1111, FIG. 3B). These operations consist essentially of making modifications to the prices of some songs installed on the jukeboxes. For example, the songs concerned by the promotions may be ordered by a promoter other than the jukebox operator. For example, these songs can be ordered and fees for the distribution of these songs can be paid by the promoter rather than by the operator. Information about songs for which a promotion is being made is contained in one of the eleventh arrays (1111, PRO\_PACKAGE, FIG. 3B). Similarly, price modifications for songs included in the promotion are contained in one of the eleventh arrays (1111, PRICING, FIG. 3B). Songs ordered by the promoter are paid for making use of a table (PRO\_PACKAGE\_CATALOGUE, FIG. 3B) that groups identifiers (CTL\_ID) of songs included in the promotion. This table is related by an argument (PPK\_ID, FIG. 3B) identifying groups of songs with a table (PROMOTION, FIG. 3B) containing the description of the promotion. This table (PROMOTION, FIG. 3B) can also be used to identify the promoter. Thus, during the calculation of royalties (described above) the server refers to the table (PRO\_PACKAGE\_CATALOGUE, FIG. 3B) to determine if the identifiers of the songs played on a jukebox are contained in this table. If an identifier of a song played on the jukebox belongs to this table, then the royalty will be invoiced to the promoter corresponding to the identifier (PRO\_ID, FIG. 3B) of the promotion to which the song belongs.

A non-restrictive description of a plurality of groups of specific tables in the database will now be given, with reference to FIGS. 3A to 3F.

12

The ACTION specific tables group belongs to the eighth set of arrays (1108, FIGS. 3A and 3F) and contains definitions of actions used in a group of specific tables SYSTEM\_LOG (described later) associated with a jukebox (JUK\_ID). Each action is identified in the ACTION specific tables group by a code (ACT\_CODE). Similarly, each ACTION specific table corresponds to a particular action. Thus for example, the ACTION table for which the action code (ACT\_CODE) is equal to "M" contains the description of the action consisting of inserting a given amount in a jukebox.

The ADDRESS specific tables group belongs to the seventh set of arrays (1107, FIG. 3A) and contains all addresses of the various persons involved in the system according to the invention, in other words operators, disk publishers, artists. Each table corresponds to a different address identifier (ADR\_ID). One address (ADR\_ADDRESS\_1) may be identical for a plurality of players and may be found in different tables.

The ALBUM specific tables group belongs to the fifth set of arrays (1105, FIGS. 2 and 3B), and contains all information about albums contained in the songs bank, in other words the name (ALB\_NAME), the main artist (ART\_ID), and the disk publisher (LAB\_ID). Each album is identified by a unique number (ALB\_ID). One specific table in this group of tables contains the identification of an album.

The ARTIST specific tables group belongs to the fifth set of arrays (1105, FIGS. 2 and 3B) and contains information about artists and/or publishers and/or authors of songs, for example such as validations of agreements for playing and copying of songs. One specific table in this table group contains the identification of an artist or a publisher or a writer.

The BUG\_COMPONENT, BUG\_ERROR\_MSG, BUG\_JUKEBOX, BUG\_KEY\_WORD, BUG\_PROGRAM, BUG\_REFERENCE, BUG\_REPORT, BUG\_SOLUTION, BUG\_SUGGESTION arrays shown in FIG. 3E are used to archive, solve or propose solutions to malfunctions that occur in remote management of jukeboxes or in the operation of jukebox programs or components.

The CATALOGUE specific tables group belongs to the fifth set of arrays (1105, FIGS. 2 and 3A and 3B), and contains information about songs contained in the database. A table in this group of tables identifies the song. In particular, each table includes a song name (CLT\_SONG\_NAME) and its length (CLT\_LENGTH).

The CATEGORY specific tables group belongs to the fifth set of arrays (1105, FIGS. 3A and 3B) and contains the list of song categories, in other words the category name (CTG\_TYPE), its description (CTG\_DESC) and an identification number (CTG\_ID). A category includes all songs of a given type, for example jazz songs will be in one category, and Christmas carols in another category.

The COLLABORATOR specific tables group belongs to the eighth set of arrays (1108, FIGS. 3A and 3B) and contains names of song writers. An argument (COL\_TYPE) will be assigned a defined value, for example W, to denote a writer. This differentiation is used for calculating royalties.

The COMMAND specific tables group, FIG. 3E, contains all commands that are exchanged between the server and the jukebox when a communication is setup between them. A table in this tables group corresponds to a command.

The COMPONENT specific tables group, FIG. 3B, contains the list of all hardware components that may be installed on a jukebox. In particular, each table contains the serial number (COM\_SERIAL\_NO) of each component and its installation date (COM\_STRAT\_DT).



US 6,578,051 B1

13

The COMPONENT\_DEF specific tables group belongs to the second set of arrays (1102, FIGS. 3B and 3D) and contains a precise description of all components listed in the COMPONENT specific tables group. In particular, each table in this group of tables contains the cost of components (COD\_COST), and the supplier identification (COD\_VENDOR\_CODE).

The COMPONENT\_INCOMPAT specific tables group belongs to the second set of arrays (1102, FIGS. 3B and 3D) and contains information about any incompatibilities between the various hardware components that can be installed on a jukebox.

The COMPONENT\_UPGRADE specific tables group belongs to the second set of arrays (1102, FIGS. 3B and 3D) and is used to keep a trace of all modifications made to the COMPONENT\_DEF specific tables group.

The CONTRACT specific tables group, FIG. 3A belonging to the seventh set of arrays 1107 is used to define the person(s) who will receive the royalties each time that each song is played.

The CLT\_CATEGORY specific tables group belongs to the fifth set of arrays (1105, FIGS. 3A and 3B) and is used to associate a song with at least one category defined in the CATEGORY specific tables group.

The EVENT specific tables group belongs to the tenth set of arrays (1110, FIG. 3F) and is used to put instructions into groups (defined later) such that they are executed at a given moment defined in the EVENT\_DEF specific tables group.

The EXECUTED\_INSTRUCTION specific tables group belongs to the tenth set of arrays (1110, FIG. 3F) and is used to archive an instruction when it has been executed on the jukebox concerned.

The FILE\_RECEPTION specific tables group in FIG. 3E contains all text files received from jukeboxes during a communication between the server and the jukebox.

The FIRMWARE specific tables group belongs to the second set of arrays (1102, FIGS. 3B and 3D) and is used to associate a hardware component described in the COMPONENT tables group and software described in the PROGRAM tables group intended to operate with the component.

The FLT\_ARTIST specific tables group belongs to the sixth set of arrays (1106, FIG. 3B) and contains a definition of filters applicable to artists installed on jukeboxes. These filters are read every time that a song is to be downloaded on a jukebox, such that a song with an artist belonging to a filter is not downloaded on the jukebox concerned by the filter. Each table in this tables group corresponds to a given filter (JUF\_ID) and a given artist (ART\_ID).

The FLT\_CATALOGUE specific tables group, FIG. 3B, is similar to the previous group but the filter applies to a song.

The FLT\_CATEGORY specific tables group, FIG. 3B, is similar to the previous group but the filter applies to a song category.

The FLT\_LABEL specific tables group, FIG. 3B, is similar to the previous group but the filter applies to a disk publisher (label).

The IBUTTON\_INDEX specific tables group, FIG. 3F sets up a link between the identification of an element of the Ibutton (defined above) and the identification of the same element in the database.

The IB\_CREDIT specific tables group belongs to the third set of arrays (1103, FIGS. 3A and 3C) and contains information about free credits that can be used on a jukebox, this information being contained in the Ibutton of the jukeboxes. A credit shows the amount of money that has to

14

be paid before a song can be played on a jukebox. This information is used to determine the maximum available number of credits, and particularly how many credits are available. Each table in this group of tables is applicable to a particular credit type.

The IB\_ISP specific tables group belongs to the third set of arrays (1103, FIGS. 3A and 3C) and contains information necessary to enable an connection to Internet, this information being contained in the Ibutton of the jukeboxes. Each table in this tables group contains in particular the connection parameters (ISP\_SERVEUR\_IP\_ADDRESS, . . . ), the user name (ISP\_LOGIN\_NAME), the password (ISP\_PASSWORD), and the telephone number of the Internet Service Provider (ISP) (ISP\_PHONE\_NO). Each table corresponds to a given connection with a given service provider.

The IB\_MIXAGE specific tables group belongs to the third set of arrays (1103, FIGS. 3A and 3C) and contains all information about sound settings on a jukebox, this information being contained in the Ibutton of the jukeboxes. A table in this tables group corresponds to a given sound setting.

The IB\_OTHER\_SETTING specific tables group belongs to the third set of arrays (1103, FIGS. 3A and 3B) and contains all information about the settings of jukeboxes contained in the Ibutton. Each table in this tables group comprises particularly the jukebox language (SET\_LANGUAGE), the availability of the telephone line (SET\_LINE\_AVAIL\_STRAT\_TIME, SET\_LINE\_AVAIL\_END\_TIME) and the version of the Ibutton (SET\_IB\_VERSION). Each table corresponds to a set of determined parameters.

The IB\_PASSWORD specific tables group belongs to the third set of arrays (1103, FIGS. 3A and 3B) and contains passwords assigned to a jukebox so that the jukebox can operate.

The IB\_REMOTE\_CONTROL specific tables group belongs to the third set of arrays (1103, FIGS. 3A and 3B) and contains setting parameters for a remote control that can be used to make a jukebox operate. These parameters correspond to parameters memorized in the Ibutton of a jukebox.

The IB\_TUNE\_COST specific tables group belongs to the third set of arrays (1103, FIGS. 3A and 3B), and contains the setting of prices to be paid on a jukebox so that one or a plurality of songs can be selected.

All IB\_XXX table groups contain all possible settings of a jukebox managed by the system according to the invention. The assignment of a particular setting, in other words a specific table in a group of tables IB\_XXX to a given jukebox (JUK\_ID) is made through another specific tables group JUK\_XXX (described later).

The INSTRUCTION specific tables group belongs to the tenth set of arrays (1110, FIG. 3F) and includes all instructions that must be transmitted to a jukebox. Each instruction is defined by a number (INS\_ID) and the destination jukebox is identified by its number (JUK\_ID). Each table in this group of tables corresponds to an instruction that is to be sent to a jukebox. Each table can also be used to determine the instruction type through a code (INS\_CODE). Each table also comprises the date (INS\_TARGET\_DT) starting from which the server 10 can transmit instructions to the jukebox. Thus, it is possible to prepare and store instructions to be sent to the jukebox in advance.

The INSTRUCTION\_DEF specific tables group belongs to the tenth set of arrays (1110, FIG. 3F) and comprises a description of all instruction types. The link between this



US 6,578,051 B1

15

tables group and the INSTRUCTION specific tables group is made using the instruction code INS\_CODE.

The INS\_ALBUM specific tables group belongs to the tenth set of arrays (1110, FIG. 3F) and contains instructions about the addition, modification or deletion of an album. Each table comprises an argument (IAL\_EXECUTION\_DT), that assures that the instruction corresponding to the table has been executed in its entirety.

The INS\_CATALOGUE specific tables group, FIG. 3F, is similar to the previous specific tables group, but the instructions relate to a song.

The INS\_IBUTTON specific tables group in FIG. 3F is similar to the specific tables group described above, but the instructions concern the modification of a parameter stored in the Ibutton.

The INS\_SOFTWARE specific tables group, FIG. 3F, similar to the previous specific tables group except that the instructions concern software.

The INS\_JEEP\_SCRIPT specific tables group belongs to the tenth set of arrays (1110, FIG. 3F) and includes instructions about the execution of an order on a jukebox. An order may create, move, rename or delete a file on the jukebox. This array also comprises the command line corresponding to the operations to be carried out.

The JUKEBOX specific tables group belongs to the first set of arrays (1101, FIGS. 2, 3A and 3E) and includes information about the installation of a jukebox. Each table in this tables group comprises in particular a jukebox identification number (JUK\_ID), its start up date (JUK-INSTALLATION\_DT), its status (JUK\_STATUT), etc. Each table corresponds to the description of a jukebox on the network.

The JUKEBOX\_LOCATION specific tables group belongs to the seventh set of arrays (1107, FIG. 3A) and contains all information about the location of the jukebox and the company renting the jukebox.

The JUK\_CONNECTION specific tables group can be used to archive all start and end dates of communications between a jukebox and the server.

The JUK\_CREDIT specific tables group belongs to the second set of arrays (1102, FIGS. 3A and 3B) and can be used to make a link with the specific tables group IB\_CREDIT so that credits can be assigned to a particular jukebox (JUK\_ID). This group of tables can also be used to archive the different configurations of credits that have been validated on a jukebox, but which are no longer authorized. The current validity setting for a given jukebox (JUK\_ID) is contained in the specific table that has the most recent date (JCR\_START\_DT). Other tables are kept as archives.

The JUK\_FILTER specific tables group belongs to the sixth set of arrays (1106, FIG. 3B) and contains descriptions of all filters that are installed on jukeboxes. Each table in this tables group corresponds to a filter identified by a unique number (JUF\_ID).

The JUK\_ISP specific tables group belongs to the second set of arrays (1102, FIGS. 3A and 3C) and makes the link with the IB\_ISP specific tables group to configure the connection of a particular jukebox (JUKE\_ID). This tables group is also used to archive the different connection settings that have been validated on a jukebox, but that are no longer authorized. The current validity setting for a given jukebox (JUKE\_ID) is contained in the specific table with the most recent date (JIS\_START\_DT). Other tables are kept as archives.

The JUK\_MIXAGE specific tables group belongs to the second set of arrays (1102, FIGS. 3A and 3C) and is used to make the link between the IB\_MIXAGE specific tables

16

group and the sound setting on a specific jukebox (JUK\_ID). This tables group also archives the different sound settings that have been validated on a jukebox, but that are no longer authorized. The setting that is currently valid for a given jukebox (JUK\_ID) is contained in the specific table with the most recent date (JMI\_START\_DT). Other tables are kept as archives.

The JUK\_OTHER\_SETTING specific tables group belongs to the second set of arrays (1102, FIGS. 3A and 3C) and makes the link between the IB\_OTHER\_SETTING specific tables group and the setting of a jukebox. This tables group is also used to archive the different settings that have been validated on a jukebox, but that are no longer authorized. The setting that is currently valid for a given jukebox (JUK\_ID) is contained in the specific table with the most recent date (JOT\_START\_DT). Other tables are kept as archives.

The JUK\_PASSWORD specific tables group belongs to the second set of arrays (1102, FIGS. 3A and 3C) and is used to make the link between the IB\_PASSWORD specific tables group and a jukebox. Each table in this tables group is used to assign a set of passwords to a given jukebox using its number (JUK\_ID). This tables group is also used to archive the different sets of passwords that have been validated on a jukebox but that are no longer authorized. The setting that is currently valid for a given jukebox (JUK\_ID) is contained in the specific table with the most recent date (JPW\_START\_DT). Other tables are kept as archives.

The JUK\_PRICING specific tables group belongs to the eleventh set of arrays (1111, FIGS. 2 and 3B) and is used to make the link between a PRICING array (described above) and a jukebox defined by its number (JUK\_ID). Each table in this group of tables is used to assign a promotion period defined in the PRICING specific tables group to a jukebox identified by its identifier (JUK\_ID).

The JUK\_PROMOTION specific tables group belongs to the eleventh set of arrays (1111, FIGS. 2 and 3B) and is used to make the link between the PROMOTION specific tables group (described below) and a jukebox. Each table in this group of tables is used to assign a particular promotion (PROD-ID) to a jukebox defined by its identifier (JUK\_ID).

The JUK\_REMOTE\_CONTROL specific tables group belongs to the second set of arrays (1102, FIG. 3B) and is used to make the link between the IB\_REMOTE\_CONTROL specific tables group and a jukebox. Each table in this tables group is used to assign a particular setting (REM\_ID) to a remote control of a jukebox defined by its number (JUK\_ID). This tables group is also used to archive different settings of the remote control that have been validated on a jukebox but that are no longer authorized.

The JUK\_TUNE\_COST specific tables group belongs to the second set of arrays (1102, FIGS. 3A and 3B) and is used to make the link between the IB\_TUNE\_COST specific tables group and a jukebox. This array is used to assign a choice of the price of particular songs (COS\_ID) to a jukebox defined by its number (JUK\_ID). This array is also used to archive different price choices validated on the jukebox but that are no longer authorized. The currently valid setting for a given jukebox (JUK\_ID) is contained in the most recent specific table (JRM\_START\_DT). Other tables are kept as archives.

The LABEL specific tables group belongs to the fifth set of arrays (1105, FIGS. 3A and 3B) and describes all distribution names of disk publishers contained in the database. Each table in this tables group contains in particular the identifier of the address of the disk publisher (ADR\_ID), the complete address being stored in the ADDRESS specific

US 6,578,051 B1

17

tables group, an identification number (LAB\_ID), and the name of the disk publisher. Each table corresponds to a disk publisher.

The LABEL\_ROYALTY specific tables group belongs to the ninth set of arrays (1109, FIG. 3F) and contains information necessary for calculating fees payable to disk publishers. Each table in the tables group is linked particularly to the PLAY\_LOG array (described later) that memorizes all distributions of songs originating on jukeboxes. The link is made by the jukebox identification number.

The LOGIN\_SCRIPT specific tables group belongs to the second set of arrays (1102, FIGS. 3B and 3D) and contains the startup scripts associated with Internet service providers.

The LOG\_RECEPTION specific tables group belongs to the eighth set of arrays (1108, FIGS. 3A and 3E) and is used to archive all log files in the jukeboxes received by the server. Each table in this tables group contains in particular the number (JUK\_ID) of the jukebox that sent the log file, the reception date (LOG\_RECEIVE\_DT), and the transmitted file (LOG\_FILE).

The MASTER specific tables group belongs to the fifth set of arrays (1105, FIGS. 3A and 3B) and defines lists of about 750 songs in the same style that may form a starting point for a list of songs available on a jukebox. Each table in the tables group comprises in particular an identification number of each list (MAS\_ID), a description of the list (MAS\_DESC) and the type of list (MAS\_TYPE). The names of songs making up the list identified in the MASTER specific tables group is contained in the MASTER\_CATALOGUE specific tables group.

The MODEM\_STRING specific tables group shown in FIG. 3E contains text strings necessary for the initialization of jukebox modems. This array is related to the IB\_OTHER\_STRING tables group containing jukebox settings and particularly the modem setting.

The OPERATOR specific tables group belongs to the seventh set of arrays (1107, FIGS. 3A and 3F) and contains all information about all operators with a jukebox managed by the device according to the invention. An operator is a user who rents one or a plurality of jukeboxes. In particular, each table group contains a unique identifier (OPE\_ID) for each operator and the name (OPE\_NAME) of each operator. Each table also contains a default setting that each operator would like to install in the jukeboxes that he rents. The default setting is identified by the (COS\_ID, REM\_ID, CRE\_ID, ISP\_ID, SET\_ID, MIX\_ID) identifiers that relate each table to the different tables in setting table groups (IB\_TUNE\_COST, IB\_REMOTE\_CONTROL, IB\_CREDIT, IB\_ISP, IB\_OTHER\_SETTING, IN\_MIXAGE) defined above.

The ORDERING specific tables group, FIG. 3A, contains all songs ordered by an operator through a jukebox, or through direct communication with the server. Each table in this tables group corresponds to an ordered song (CTL\_ID). As soon as the song has been sent to the jukebox, the table corresponding to the sent song is erased by the server 10.

The PACKAGE specific tables group belongs to the second set of arrays (1102, FIGS. 3B and 3D) and contains information about program groups installed on jukeboxes. The composition of these groups is contained in the PACKAGE\_DEF specific tables group.

The PHONE specific tables group, FIG. 3A, contains all telephone numbers useful for management of jukeboxes. Each table in this tables group contains the telephone number (PHO\_NUMBER), the identification of the person to whom the number belongs (PHO\_OBJECT\_SOURCE),

18

the identifier of the array containing information about the holder (PHO\_OBJECT\_ID), the type of line corresponding to the number (PHO\_TYPE) in other words whether the number is a fixed telephone number, or a fax number or a portable telephone number.

The PLAY\_LOG specific tables group belongs to the eighth set of arrays (1108, FIGS. 3A and 3E) and is used to archive all distributions of songs to jukeboxes. The tables in this tables group are updated every time that a jukebox sends a log file to the server. Each table corresponds to the distribution of one song.

The PROGRAM specific tables group belongs to the second set of arrays (1102, FIGS. 3B and 3E) and contains all versions of all programs used. Each table in this tables group contains in particular the name (PGD\_NAME), and the version (PGM\_VERSION) of the program, but also the program itself (PGM\_CODE\_SOURCE). Each table corresponds to one version of a program. Programs designed to run on jukeboxes are described in the PROGRAM\_DEF specific tables group.

The PROMOTION specific tables group belongs to the eleventh set of arrays (1111, FIG. 3B) and is used to describe promotions that could apply to a jukebox. For example, a promotion might be a cost reduction or a free play of one or a plurality of given songs. Songs affected by the promotion are listed in the PRO\_PACKAGE\_CATALOGUE specific tables group. The promotion may be broadened to include all songs by a given artist. In this case, the artist identifiers (ART\_ID) concerned by the promotion are contained in the PRO\_PACKAGE\_ARTIST specific tables group. Similarly, a promotion may contain promotions on given songs or on all songs by an artist at the same time, and in this case a PRO\_PACKAGE array will contain an argument used to relate the PRO\_PACKAGE\_ARTIST and PRO\_PACKAGE\_CATALOGUE tables to the PROMOTION tables. Similarly, a PRO\_PRICING tables group also comprises an argument used to relate the PROMOTION specific tables group to the PRICING specific tables group containing a precise definition of the periods during which the promotion is valid.

The PUBLISHER specific tables group (not shown) belongs to the ninth set of arrays (1109, FIG. 3F) and contains all information about publishers.

The PUBLISHER\_ROYALTY specific tables group belongs to the ninth set of arrays (1109, FIG. 3F) and contains all information about the payment of fees to publishers of distributed songs or songs copied on a jukebox.

The REPLACEMENT\_PROGRAM specific tables group belongs to the ninth set of arrays (1102, FIGS. 3B and 3D) and is used to indicate that one program (PGD\_NAME) is replaced by another program (REP\_PGD\_NAME) starting from a given date (REP\_START\_DT).

The SOFTWARE specific tables group belongs to the second set of arrays (1102, FIGS. 3B and 3D) and is used to make the link between a program and a jukebox on which the program is installed. Each table in this tables group is used to assign a program (PGD\_NAME) to a jukebox defined by its number (JUK\_ID). Each table is also used to archive the different program installations that were validated on a jukebox but that are no longer authorized. The current valid setting for a given jukebox (JUK\_ID) is contained in the specific table with the most recent date (SOF\_START\_DT). Other tables are kept as archives.

The SONG specific tables group belongs to the fourth set of arrays (1104, FIGS. 2 and 3A) and is used to make the link between downloaded songs and a jukebox on which songs were downloaded. Each table in this tables group is used to



US 6,578,051 B1

19

assign a song (CLT\_ID) to a jukebox defined by its number (JUK\_ID). This tables group is used to obtain a song downloading history and determine the fees to be paid for each downloading. This tables group can also be used to archive different songs that were installed on a jukebox.

The SYSTEM\_LOG specific tables group belongs to the eighth set of arrays (1108, FIGS. 3A and 3E) and contains all information transmitted by jukeboxes in log files, apart from information concerning distributions of songs contained in the PLAY\_LOG specific tables group.

The WAREHOUSE specific tables group belongs to the seventh set of arrays (1107, FIG. 3A) and is used to assign one or a plurality of jukeboxes to an operator's company. One operator may have a plurality of companies. Therefore, it is easier for the management of jukeboxes rented by this operator, to assign each jukebox to a company.

FIGS. 5A to 5H show different windows in which the information in database arrays is displayed. The server comprises a presentation module forming a user interface, in order to more easily manipulate information contained in the sets of arrays in the database of the system according to the invention. This module is used to display information in the database in an easy to read form, but also to selectively collect this information such that a user who is not familiar with the architecture of the database can access some information, even on the server. Furthermore, this module can be used to modify, add or delete information in the database.

Essentially, this module displays a plurality of screens or windows each containing either information display areas, or information input areas, or selection areas or buttons, on a monitor. Selection areas are usually related to procedures that in particular initiate the collection and storage of information in the database or the validation of information input in input areas.

A first screen 200 shown in FIG. 5A is intended to display or manipulate all information about a jukebox. This screen 200 contains a plurality of areas 201.1 to 201.22 that may be display areas or input areas. Each of these areas 201.1 to 201.22 corresponds to an argument in the JUKE-BOX array, FIG. 3A. When a user would like to refer to information about an existing jukebox, he simply inputs the identification number of the required jukebox in a first input area 201.1 and validates this input by selecting a first selection area 202. This selection triggers a search among all values of arguments in the JUKEBOX specific tables group, FIG. 3A in the database, to find the one with an identification number that corresponds to the input number. Once this information has been collected, it is displayed in the corresponding display areas 201.2 to 201.22. When the user would like to create a new jukebox, he simply inputs a number that has not yet been used in the first area 201.1 corresponding to the identification number, and then validates his choice by selecting a second save area 203. This save triggers the creation of a new table in the JUKEBOX specific tables group, FIG. 3A, and generation of a password necessary for operation of the new jukebox and that is displayed in the corresponding display area 201.2. Apart from the display areas 201.1, 201.2 corresponding to the jukebox number and the password, the other input areas 201.3 to 201.22 are blank. The first array 200 also comprises a plurality of series of selection buttons 204 to 207 each of which triggers the display of a new screen. These new screens will display information about the creation, update or operation of the jukebox identified by the number input in the corresponding area 201.1 on the first screen 200.

A first series 204 of buttons is used to setup a jukebox with previously defined default parameters. Selection of a first

20

button 204.1 causes the l-button of the jukebox corresponding to the number input or displayed in the first area 201.1 to be initialized, thus this operation assigns a default value for each operating parameter of the jukebox. A second button 204.2 displays a screen (not shown) that assigns a predefined list of songs to the jukebox, and these songs will then be installed on the jukebox to create the list of songs available on the jukebox. A third button 204.3 displays a screen (not shown) that assigns a predefined list of programs to the jukebox, that will be used to operate the jukebox.

A second series 205 of buttons is used to display the description of components of the jukebox. A first button 205.1 causes the display of a screen (not shown) containing a plurality of fields used to display information about the operator. This information is collected in the OPERATOR tables group, FIG. 3A, for the identifier of the operator renting or owning the jukebox. A second button 205.2 displays a screen (not shown) comprising a plurality of fields used to display information about programs installed on the jukebox. This information is collected in the SOFTWARE tables group, FIG. 3B, and in the PROGRAM\_DEF tables group, FIG. 3D. A third button 205.3 causes the display of a screen (not shown) comprising a plurality of fields used to display information about hardware components installed on the jukebox. This information is collected in the COMPONENT tables group, FIG. 3B and in the COMPONENT\_DEF tables group, FIG. 3B. A fourth button 205.4 causes the display of a screen (not shown) comprising a plurality of fields used to display the list of songs now on order for the jukebox. This information is collected in the ORDERING tables group, FIG. 3A. A fifth button 205.5 causes the display of a second screen shown in FIG. 5B. The display of this screen is preceded by a collection of information in the SONG array, FIG. 3A and the CATALOGUE array, FIG. 3B, to display the list of songs available on the jukebox identified by its identifier, in a combolist 211 on the second screen 210. Songs are identified by their number 212 and their name 213. The numbers of all song are collected in the SONG specific tables group, and for each song on the jukebox, the server is provided with means of displaying the purchase date, the delivery date, the transfer time, the song deletion date and the song name, these elements being collected in the CATALOGUE specific tables. This second screen 210 is intended for viewing only, and does not include an input area.

A third series 206 of buttons displays a screen used to view jukebox operating parameters. Each button 206.1 to 206.7 actually causes the display of parameters identified in each table in the JUK\_PASSWORD, JUK\_TUNE\_COST, JUK\_REMOTE\_CONTROL, JUK\_MIXAGE, JUK\_ISP, JUK\_CREDIT, JUK\_OTHER\_SETTING table groups, FIGS. 3A and 3C, for which the argument identifying the jukebox corresponds to the identifier displayed in the first display area 201.1 on the first screen 200, FIG. 5A. Thus, selecting one of the buttons 206.1 to 206.7 initially triggers a collection of information in the JUK\_AAA tables group corresponding to the button, to find the table for which the jukebox identifier number corresponds to the required number. Information is then collected in table IB\_AAA in the tables group associated with table JUK\_AAA to determine the value of parameters corresponding to the identifier of the parameter set found in the table in the JUK\_AAA tables group. As a non-restrictive example, selecting a first selection button 206.1 in the third series will trigger collection of information in the JUK\_MIXAGE and IB\_MIXAGE arrays, both FIG. 3A, to display sound settings for the jukebox selected in the first screen, in a third screen 220.

US 6,578,051 B1

21

This third screen 220 is intended for viewing only, and does not have an input area. The various sound volume adjustment settings (maximum 221.4, volume 221.1, bass 221.2, treble 221.3) for the right and left channels for each area 221a, 221b are displayed in the display areas 221. Display areas are used to display volume settings for a microphone 222.1, an auxiliary source 222.2, and background music 222.3.

A fourth series 207 of selection buttons is used to display a screen to manage jukeboxes and particularly communications between the server and jukeboxes. A first button 207.1 causes the collection of information by the server in the INSTRUCTION, INSTRUCTION-DEF, and INS\_XXX table groups, FIG. 3F, to display a fourth screen 230 containing the list of instructions to be sent to the jukebox selected in the first screen 200, and displayed in a first display area 234. Therefore, this fourth screen 230 comprises an area 231 in which previously defined instructions can be displayed, or in which these instructions can be modified or new instructions can be added. The fourth screen 230 comprises a save button 232 used to validate instructions input or modified in the input area 231 until the given send date. This validation also causes an update to the INSTRUCTION, INSTRUCTION-DEF, and INS\_XXX table groups.

A second button 207.2, provokes the collection of information in the PLAY\_LOG tables group in FIG. 3A, and then displays a screen, for example displaying the history of all songs played on a jukebox identified by the identifier number displayed in the first area 201.1 in the first screen 200. After the collection of information in the SYSTEM\_LOG tables group in FIG. 3A, a third button 207.3 displays a screen, for example displaying the history of all actions executed on the jukebox identified by the identifier number displayed in the first area 201.1 in the first screen 200. For examples, these actions consist of subsequently inserting an amount of money in the jukebox coin slot. A fourth button 207.4 provokes the collection of information in the COMMAND tables group, and then displays a screen for example displaying the history of all orders that have been executed on the jukebox identified by the identifier number displayed in the first area 201.1 of the first screen 200. A fifth button 207.5 provokes the collection of information in a JUK\_CONNECTION tables group, and then displays a screen displaying all connections setup between the server and the jukebox identified by the identifier number displayed in the first area 201.1 of the first screen 200 when the jukebox makes the connection with the server. A sixth button 207.6 provokes the collection of information in the LOG\_RECEPTION tables group, FIG. 3E, and then displays a screen displaying the history of all log files received by the server and sent by the jukebox identified by the identifier number displayed in the first area 201.1 of the first screen 200. A seventh button 207.7 provokes the collection of information in the EXECUTED\_INSTRUCTION tables group, FIG. 3F, and then displays a screen displaying the history of all instructions executed on the jukebox identified by the identifier number displayed in the first area 201.1 of the first screen 200.

A fifth screen 240 is used to update the songs bank contained in the database. This screen 240 is used in particular to add albums or to modify data in the songs bank, particularly when distribution rights are obtained and/or when songs are processed to be downloaded on jukeboxes. Therefore, this fifth screen 240 comprises essentially the input areas 241.1 to 241.4 used to indicate all information about albums. Each input area 241 corresponds to an argu-

22

ment in the ALBUM array, FIG. 3A in the database. A first area 241.1 contains the album identifier. A second area 241.2 contains the album name. A third area 241.3 contains the name of the artist starring in the album. A fourth area 241.4 contains the name of the disk publisher. The fifth screen 240 also comprises a combolist 243 that displays the list of songs on the album identified by its identifier. Thus, validating the input by selection of a first selection area 242 makes the server update the ALBUM array, FIG. 3A, either to modify the corresponding arguments if the input consists of a modification to an existing album, or to add a table in the tables group when the input corresponds to adding a new album into the songs bank.

A sixth screen 250 is used to create lists of songs (master). These lists can then be used as a starting point to initialize the list of songs available on a jukebox. The sixth screen comprises a number of input areas used to identify the list 251.1, for example to briefly describe the list 251.2 and to define the list type 251.3, in other words whether it is a list still being produced or a final list. Each input area 251.1 to 251.3 actually corresponds to an argument in the MASTER array, FIG. 3B. The sixth screen 250 also comprises a first combolist 252 containing the list of songs in the songs bank and a second window 253 containing the list of songs already selected to form part of the current list. The sixth screen 250 also comprises a save button 254 used to validate the list produced. This selection either provokes the creation of a table in the MASTER specific tables group, FIG. 3B, and creation of a table in the MASTER\_CATALOGUE specific tables group for each song in a new list, FIG. 3B in the case of a new list, or provokes the addition or deletion of a table in the MASTER\_CATALOGUE specific tables group, FIG. 3B, for an update to an existing list.

A seventh array 260 displays all rows in the PUBLISHER array. This particular information collection is made by the server and is used to manage royalties associated with each publisher. In order to do this, the seventh screen 260 comprises a combolist 261 composed of a plurality of lines. Each line comprises a first field 261.1 representing the artist's identifier, a second field 261.2 representing the artist's name, in other words in this case the name of the publishing company, a third field 261.3 representing the name of the publishing company's administrator, a fourth field 261.4 identifying whether or not the publisher is in the catalogue, and a series of fields 261.5 to 261.9 used to define whether or not the publisher allows reproduction and distribution rights. Thus, a first field 261.5 indicates the date on which the written distribution authorization was granted. A second field 261.6 indicates the date on which the signature is expected for authorization. A third field 261.7 indicates the date starting from which the contract for the agreement about the distribution of fields has been waiting for comments. A fourth field 261.8 indicates the date on which a verbal agreement was obtained. A fifth field 261.9 indicates the date from which the distribution agreement is no longer valid.

A seventh screen 270 is used to make the inventory of programs used by jukeboxes. The seventh screen 270 comprises a first combolist 271 used to display the list of program versions and if there are any incompatibilities with other programs or hardware components. This information is displayed through information collection in the PROGRAM and PROGRAM\_INCOMPACT arrays, FIG. 3D, in the database. In order to do this, a first field 271.1 contains the program name. A second field 271.2 contains the program version, a third field 271.3 contains the name of the company that distributes the program. A fourth field 271.4



US 6,578,051 B1

23

indicates the date on which the program will be available. A fifth field 271.5 indicates the person who modified the program (if any). A sixth field 271.6 indicates if there are any incompatibilities with other programs. A seventh field 271.7 indicates if there are any incompatibilities with one or more hardware components.

A second combolist 272 displays the list of jukebox numbers on which a program selected in the first window 271 is installed, and the installation date and possibly the deinstallation date. This information is displayed after collecting information in the SOFTWARE specific tables group, FIG. 3B, in the database. The second window thus comprises a first field 272.1 containing the identifier numbers of jukeboxes on which the program is installed. A second field 272.2 contains the date on which the program was installed on the jukebox. A third field 272.3 contains the date on which the program was deleted from the jukebox.

A third combolist 273 is used to verify if the program selected in the first window 271 is associated with a hardware component. This information is displayed after collecting information in the FIRMWARE and COMPONENT\_DEF arrays, FIG. 3B, in the database. Thus, a first field 273.1 contains the component identifier. A second field 273.2 contains the description or name of the component. A third field 273.3 contains the component installation date.

A fourth combolist 274 is used to verify if the program selected in the first window 271 has been replaced, and possibly when the program was or will be replaced. This information is displayed after collecting information from the REPLACEMENT\_PROGRAMM specific tables group, FIG. 3D, in the database. Thus, a first field 274.1 contains the program name. A second field 274.2 contains the program version. A third field 274.3 contains the date on which the program replacement was started. A fourth field 274.4 indicates the date on which program replacement was terminated. A fifth field 274.5 may, for example, contain a brief description of modifications made to the program at the time of the replacement.

Other screens may be created on a same model as the screens described above to display other information contained in the database. The displayed information may

24

consist of a simple display of information contained in an array in the database, like for example for the first screen 200, or it may also be the result of a selective information collection, in other words the information search is made with particular criteria, for example as for the seventh screen 260. Similarly, some screens do not necessarily include an input area, in other words these screens are used solely to view information, for example the third screen 220.

It can be seen that the device according to the invention makes it easy to remotely control a plurality of jukeboxes from a central location through a telecommunications network, for example a telephone network.

Obviously, persons with experience in the subject will realize that this invention can be embodied in many other specific forms without going outside the scope of the invention as claimed. Consequently, these embodiments must be considered as an illustration, and can be modified within the limits defined by the field of the attached claims, and the invention must not be restricted to the details given above.

What is claimed is:

1. A management device for a network of jukeboxes, comprising a database with a plurality of sets of arrays, each array containing grouped information on the composition of a jukebox, use of the jukebox or payment of fees on the jukebox, the database being managed by a server operable to communicate with the jukeboxes, wherein the server receives messages sent by the jukeboxes containing information necessary to update determined sets of arrays in the database, and to send messages to the jukeboxes in order to update data or programs on each jukebox with information stored in at least one set of arrays in the database and transmitted to the jukebox in the message, wherein a first set of arrays in the database includes information about the operating status of each jukebox, and a second set of arrays in the database includes information about the hardware and software composition of each jukebox.

2. The management device of claim 1, further including a third set of arrays comprising possible values for different operating and setting parameters sets for the jukeboxes.

\* \* \* \* \*

# **Exhibit C**



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(12) **United States Patent**  
Nathan et al.

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(45) **Date of Patent:** Jun. 29, 2004

(54) **COMMUNICATION DEVICE AND METHOD BETWEEN AN AUDIOVISUAL INFORMATION PLAYBACK SYSTEM AND AN ELECTRONIC GAME MACHINE**

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(\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 287 days.

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(58) **Field of Search** ..... 463/1, 25, 30-35,  
463/37, 40-43; 705/26-27, 52; 709/218-219,  
250

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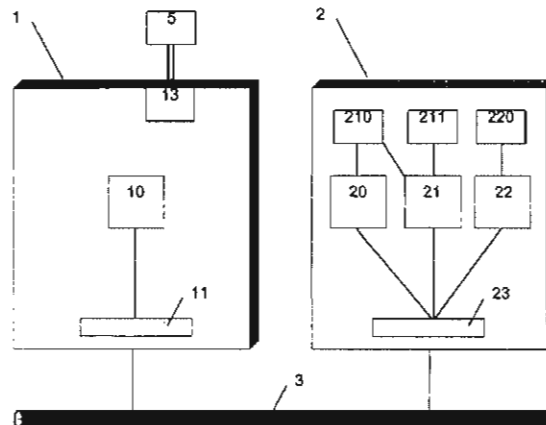
*Primary Examiner*—Kim Nguyen

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(57) **ABSTRACT**

A communication device between an audiovisual information playback system and at least one electronic game machine, each game machine including a viewing means for interacting with the user and a means of payment, wherein each electronic game machine is connected to the playback system via a network interface and an associated network. The device also includes specific managing means for managing means of payment, a viewing means and an interactive means to enable the selection and payment of at least one selection stored on the playback system, the managing means being triggered by activation of the electronic game machine.

11 Claims, 2 Drawing Sheets





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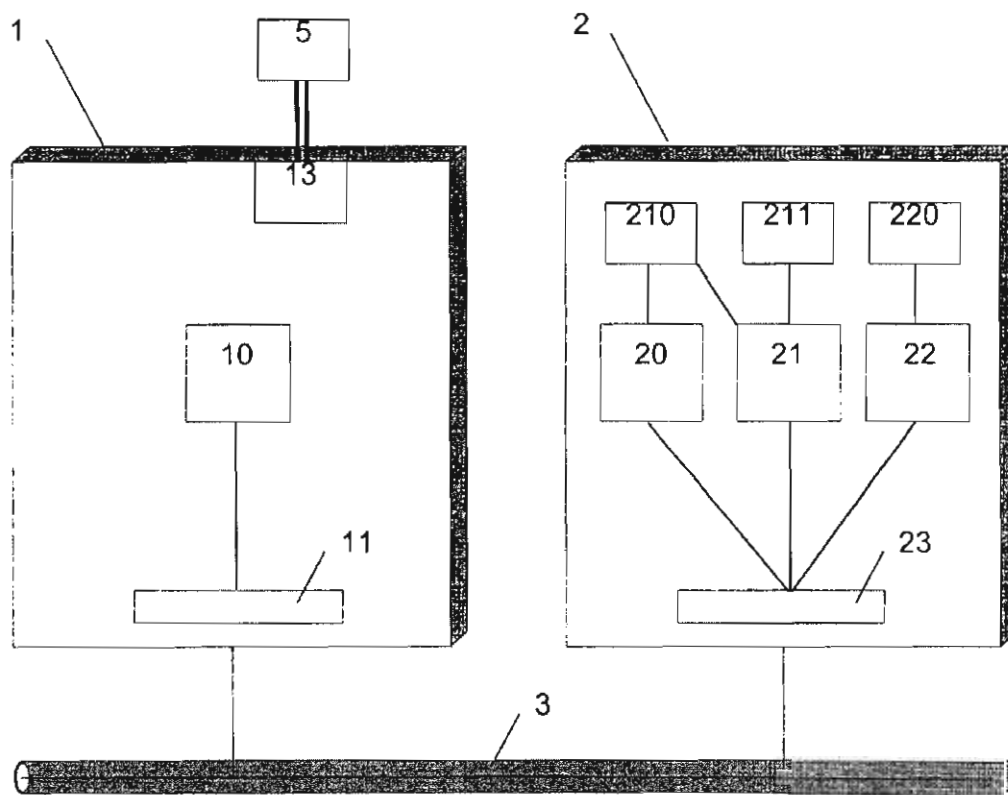
**U.S. Patent**

Jun. 29, 2004

Sheet 1 of 2

**US 6,755,744 B1**

FIG. 1



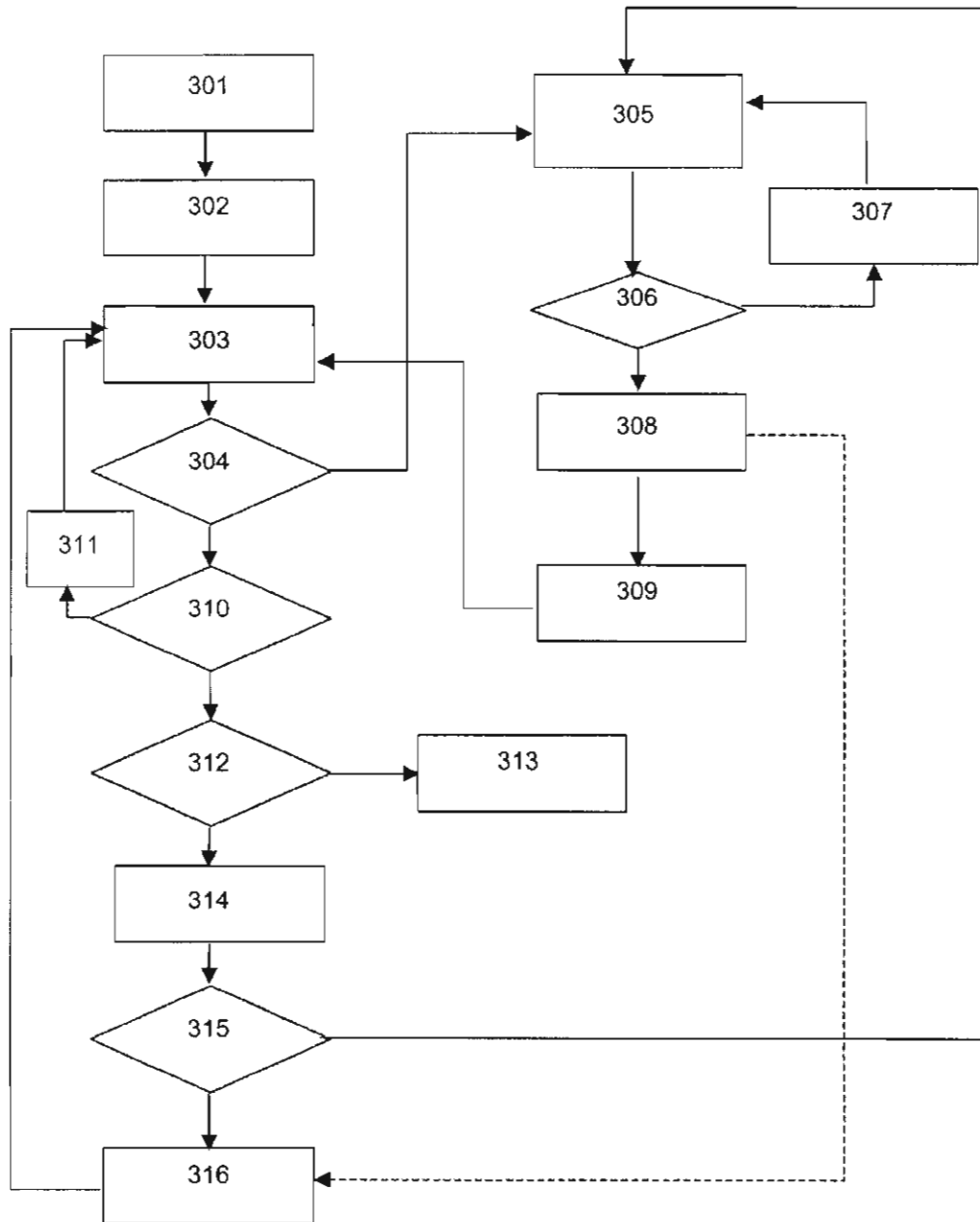
**U.S. Patent**

Jun. 29, 2004

Sheet 2 of 2

**US 6,755,744 B1**

FIG. 2



US 6,755,744 B1

1

# COMMUNICATION DEVICE AND METHOD BETWEEN AN AUDIOVISUAL INFORMATION PLAYBACK SYSTEM AND AN ELECTRONIC GAME MACHINE

## FIELD OF THE INVENTION

The invention relates to a communication device and method between an audiovisual information playback system and at least one electronic game machine.

## BACKGROUND OF THE INVENTION

In the prior art, an audiovisual information playback system is known, in particular from the European patents EP 786 212, and EP 786 122 filed by the applicant. This system mainly comprises a selection means and a playback means enabling a user to choose a musical selection that will be played back by the system.

Also, electronic game machines based on a microprocessor system are known. These machines have no connection interface and cannot be used as terminals of a playback system, and the jukebox cannot be used for collecting data from the machines.

## OBJECT AND SUMMARY OF THE INVENTION

It is therefore an object of the invention to compensate for the drawbacks of the prior art by proposing a communication device allowing game machines to be used as terminals for the playback system.

This object is achieved by a communication device between an audiovisual information playback system and at least one electronic game machine, each electronic game machine comprising a viewing means, a means for interacting with the user and a means of payment, characterized in that each electronic game machine is connected to the playback system via a network interface and associated LAN and comprises a specific means for handling the means of payment, the viewing means and the interactive means, to enable, at the electronic game machine, the selection and payment of at least one selection stored on the playback system with a view to playback thereof on the playback system, the specific means 22 of managing means of payment and the specific means 21 of managing viewing means and interactive means, being triggered by activation means for the electronic game machine 2.

Another object is that of proposing a communication method allowing game machines to be used as terminals for the playback system.

This second object is achieved by a communication method between an audiovisual information playback system and at least one electronic game machine, each electronic game machine comprising a viewing means, a means for interacting with the user and a means of payment, the playback system being connected to each electronic game machine via a LAN, characterized in that the method comprises:

- a step of activating specific management means of an electronic game machine to change the original operating mode of the electronic game machine into a mode implementing the following steps:
  - a step of setting up a connection between the playback system and the electronic game machine;
  - a step 303, 304 of transferring graphical dialog screens, from the playback system to the electronic game machine 2, prompting a user to choose a musical selection or to trigger a payment step;

2

- a step 308 of choosing a musical selection;
- a step 315 of paying for the chosen selection
- a step of playing back, by means of the playback system 1, the selection made.

## BRIEF DESCRIPTION OF DRAWINGS

The invention, together with its features and advantages, will be more apparent from reading the description provided with references to the appended drawings, where:

FIG. 1 represents a diagram of the device according to the invention,

FIG. 2 represents a flow chart of the method according to the invention.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

As explained above, the invention relates to a communication device between an audiovisual information playback system, hereafter called a jukebox, with the aim of simplification, and at least one electronic game machine.

The invention will now be described with reference to FIG. 1. An example of a jukebox 1 is described in the European patents EP 786 212 and EP 786 122 filed by the applicant. Such a jukebox 1 substantially comprises a means of payment, a viewing means associated with a means for interacting with the user, a sound playback means and a mass storage means for storing a plurality of musical selections. The jukebox 1 may also comprise a modem 13 or equivalent means for communicating with a remote server 5, e.g., for updating the library of musical selections.

In order to specify the context of the invention, it should be understood that the electronic game machines 2 are for instance electronic games or internet access stations. Thus, the electronic game machines 2 do not originally provide functionalities such as that of a jukebox or a jukebox terminal.

As a minimum, each electronic game machine 2 must originally comprise a viewing means 210, such as a video monitor, a means for interacting with a user 211, and its own means of payment 220. The interactive means 211 include for instance either a touch screen or a mouse-like pointer, or else push buttons or a keyboard.

The principle of the invention is that these electronic game machines 2 can be used as add-on selection means and means of payment for a jukebox 1, located nearby, in the same bar as the electronic game machines 2. Thus, each electronic game machine comprises a means for selecting between two operating modes. The first operating mode corresponds to the original operating mode of the electronic game machine, i.e. the machine is operating as an electronic game or an internet access station. In this mode and according to a first alternative embodiment, no communication is taking place between the jukebox 1 and the electronic game machine 2. In the second operating mode, the electronic game machine 2 is converted into an add-on selection means and a means of payment for the jukebox. In this mode, all the original functionalities are unused to allow for the selection and payment functions of the jukebox 2.

According to the invention, each electronic game machine 1 is fitted with a means 23 of connecting to a local communication network 3. The main feature of the local communication network 3 is that it must be bi-directional. Thus, the LAN 3 can be for instance of a radio frequency or of a wired type, or else it can use electric carrier currents. Preferably, in order to restrict installation costs, the connec-



US 6,755,744 B1

3

tion means 23 will be chosen to be adaptable to an existing LAN. Also, the jukebox 1 furthermore comprises a means 11 of the same type for connecting to the local communication network 3.

Thus, via an appropriate communication protocol, the jukebox 1 can send and receive messages to and from each electronic game machine 2 through the local communication network 3. Management of the dialog with each electronic game machine 2 is provided by a special so-called dialog module 10 of the jukebox operating system.

The type of connection between the game machine 2 and the jukebox depends on the quantity of information to be transmitted to the game machine 2. The greater the quantity of information, the higher the throughput of the connection must be so as not to hinder the operation of the game machine 2.

Similarly, as a general rule, the type of connection between jukebox 1 and server 5 is different from the type of connection between game machine 2 and jukebox 1. Indeed, the communication between the jukebox and the server is rather of the long-range type when the connection between the game machines 2 and the jukebox 1 is rather of the LAN-type.

According to the invention, the interactive means 211 of each electronic game machine 2 comprises an activation means allowing switching of the operation of the electronic game machine 2 from a normal mode to the jukebox terminal mode, or vice versa. This activation means can consist, for instance, of a virtual button displayed on the monitor of the game machine 2 and onto which a pointing device (mouse cursor, or user's finger, or light pen) is moved for activating the functionality associated with the button. Also, each electronic game machine 2 comprises a means 20, 21, 22 of managing a viewing means 210, an interactive means 211 and a means of payment 220 to provide the operation of the electronic game machine 2 according to the second mode. Indeed, the second operating mode requires the viewing of specific selection screens as well as different management of the means of payment in comparison with the first operating mode of the electronic game machine 2.

These specific means are for instance software modules 20, 21, 22, e.g. loaded when the modification of the machine is installed and which belong to or are added to the operating system of each electronic game machine 2. The specific means also comprise an interface 23 communicating with the connection means comprising notification means so that each software module can transmit notifications or receive messages from the jukebox 1.

A first so-called supervisor module 20 comprises e.g., a first routine, respectively a second routine, that manages initialisation, respectively termination, of the operation of the electronic game machine 2 in the second operating mode, i.e. in the mode allowing the selection and payment for pieces of music from the jukebox 1.

Thus, when the game machine 2 is operating according to the first mode, a user selecting the activation means initiates the first routine of the supervisor module 20 which is then activated for initialising a second module 21, called the graphic management module. The graphic management module 21 is for managing the selection means 211 and the viewing means 210 of the electronic game machine 2. The supervisor module 20, via the first routine, initialises a third module 22 for managing the viewing of the means of payment 220 of the electronic game machine 2 according to the second mode.

The supervisor module 20 comprises a means for also initiating the sending of a message, via the notification

4

means, through the LAN 3, to the jukebox 1, in order to notify the dialog module 10 of the jukebox 1 that the electronic game machine 2 has switched to the second mode. Upon receipt of this notification, the jukebox, via the dialog module 10, becomes the master of the dialog with the electronic game machine 2 and all the game functions of this machine are ignored. In response to this notification, the dialog module 10 comprises a means of sending messages to the graphic management module 21 which allows graphic user dialog screens to be displayed. These screens are for guiding the user when choosing songs and using the game machine 2 as the add-on selection means and means of payment of the jukebox.

Also, the interactions of the user with the selection means 211 of the game machine 2 are translated by the graphic management module 21 into messages that are then transmitted via the notification means to the dialog module 10 of the jukebox 1 to initiate the corresponding action, i.e., send the information allowing a screen display, to the machine 2 or validate a user choice.

According to the invention, the welcome screen sent and then displayed by the graphic management module 21 on the viewing means 210 of the electronic game machine 2 prompts the user to select a song from among the collection of songs available on the juke box. This welcome screen also includes a first display area containing the amount of money available to buy one or more credits. A credit represents the possibility of validating a musical selection to prompt its playback. Hence the amount available corresponds to a sum of money which has not been used by the user to pay for credits so as to purchase plays of songs or to pay for credits in order to be able to play a game on the game machine. A second display area contains the number of remaining credits to be used for the operating mode as a juke box terminal. The amount available is, for example, stored and administered by the management module 22 of the payment means of the game machine 2.

In an embodiment variant where the game machine 2 permits the user to accumulate points usable in the game machine 2 in order to obtain new game credits, the module 22 for managing the payment means may include a sub-module that uses a rule for converting accumulated points into an available sum of money. Consequently, when the welcome screen is displayed calculation means of the module 22 for managing the payment means firstly converts accumulated points into an available sum of money called a virtual sum. Secondly, the calculation means of the module 22 of managing the payment means add this virtual available sum of money to the so-called real available sum of money corresponding to a real sum of money paid using the payment means of the game machine 2. The result of this addition, corresponding to the available sum of money displayed, is transmitted to the dialog module 10 of the juke box which then sends information permitting the display on the game machine 2 of the welcome screen comprising the display of the calculated available sum of money.

The welcome screen may also include a virtual button which when it is selected, triggers a payment procedure managed by the module 22 of managing payments and the graphic management module 21. This payment procedure firstly comprises the sending, by the dialog module 10 and then the display of a payment screen by the module 21 of graphically managing the display means 210 of the electronic game machine 2. This payment screen includes a text area describing at least one rule of payment. By rule of payment one should understand a rule which defines the sum of money necessary to purchase a determined whole number

US 6,755,744 B1

5

of credits of musical selections. The module 22 for managing the means of payment checks the value of the sum available (possibly containing a real sum and a virtual sum as previously defined) and sends a notification to the dialog module 10 of the juke box containing the total sum of money available for the identified game machine 2. On the reception of this notification, the juke box determines that they are the rules of payment authorized from among the list of available rules of payment and then sends the information that permits the display on the game machine 2 of the payment screen indicating, by a specific display, which are the authorized rules of payment in relation to the available sum of money. If no authorized and displayed rule of payment on the screen satisfies the user, that is to say if the amount available is insufficient to purchase the desired number of credits for musical selections, the user can then insert a sum of money or a means of payment in the game machine 2 in order to increase the amount available.

For each amount of money detected by the means of payment 220 of the game machine 2, the third management module 22 of the means of payment notifies the dialog module 10 via the notification means of the amount inserted into the electronic game machine 2 and modifies the value of the amount available. Upon receipt of the information corresponding to the amount received by the electronic game machine 2, the jukebox 2 determines the new value of the amount available and sends a message interpreted by the graphic module 21 in order to display a new payment screen in which new authorized rules of payment can be displayed, if the sum of money inserted permits.

The payment screen can include a virtual validation button, the selection of which causes either validation of the selected payment rule by the user from among the authorized payment rules and return to the welcome screen, or simply return to the welcome screen if no payment rule has been selected by the user. When a payment rule is validated, the calculation means of the module 22 for managing payment means calculates the new value of the amount available by deducting from the total available sum, the sum of money corresponding to the rule of payment selected by the user in order to acquire a certain number of credits. When the total available amount includes a virtual part and a real part, the calculation means use predetermined rules that define the proportions in which the virtual and real parts must be used in order to deduct the sum of money from the available amount. Hence, it may be previously defined by parameters that the virtual part is used up as a priority or that the virtual and real parts of the total available amount are used in an identical way.

The new available amount and the chosen payment rule are notified to the dialog module 10. On reception of this notification, the dialog module 10 sends a message interpreted by the graphic module 21 in order to display the welcome screen, possibly with the new available amount and the new number of credits for musical selections. The number of credits available is stored and updated, either on the game machine 2 or on the juke box. In the latter case, the value of the number of credits is associated with the identification of the corresponding game machine 2. In the case where the value of the number of credits is stored on the game machine 2, updating of the value of the number of credits available is carried out by sending a message from the dialog module 10 to the module 22 for managing payment of the game machine 2 indicating the new value of the number of credits. On reception of this message, the module 22 for managing payment carries out the update locally on the game machine 2.

6

In the case where the value of the number of credits is stored on the juke box, the value of the number of credits is increased locally on the juke box, on reception of notification indicating the payment rule selected after validation by the user.

In an embodiment variation, the modification of the amount available can occur at any time through the insertion of a sum of money or of a means of payment into the game machine. In this variant, for each sum of money detected by the means 220 of payment of the game machine 2, the third module 22 for managing the payment means notifies the dialog module 10 by means of notification means, the amount inserted into the electronic game machine 2 and modifies the value of the amount available. On receipt of information corresponding to the amount received by the electronic game machine 2, the juke box 1 determines the new value of the amount available and sends a message interpreted by the graphic module 21 in order to modify the current screen in such a way that the displayed amount available corresponds to the calculated amount.

In an embodiment variant, it is possible that the minimum payment amount for the game machine 2 is greater than the minimum payment amount for the rules of payment of the juke box. By way of example, the minimum amount for the payment for a single selection is 1 franc while the minimum amount for the payment of one party on the game machine is 5 francs. Hence the case can occur that after selection of a payment rule, the remaining amount available is 3 francs and after using musical selection credits, the user swings over to the first operating mode corresponding to the original operating mode of the game machine 2. In this case, the module 22 managing the means of payment transfers an amount available which is not, a priori provided for permitting use of the game machine 2 in games mode. To remedy this situation, the means, for example the software, permitting operation according to the first mode are modified so that they take all the amounts into consideration. Another solution consists of displaying on the payment screen only the rules of payment, for which the amount corresponds to a multiple of the minimum amount accepted by the game machine 2 in games mode. Finally, another solution consists of displaying on the payment screen only the rules of payment, selection of which ends up with either a reduction of the amount available to zero or reduction of the amount available to a value at least equal to the minimum payment amount for the game machine 2.

Selection of a musical work by the user is carried out by interactions with the welcome screen. As previously explained, the interactions of the user with the selection means 211 of the game machine 2 are translated by the graphic management module 21 into messages which are then transmitted by means of notification means 23 to the dialog module 10 of the juke box 1 to trigger the corresponding action, that is to say to send information permitting the display of a new screen on the machine or the modification of a screen.

When the user validates or confirms a musical selection made via a given action at the interactive means 211 of the electronic game machine 2, for example on a virtual validation button, the graphic management module 21 sends a notification to the dialog module 10 containing validation information and an identification of the selection. Upon receipt of this notification, the dialog module 10 then verifies the number of credits available. If the number of credits is different to zero, the dialog module 10 causes the activation of a jukebox 1 software module allowing insertion of the chosen selected work into a queue, with a view to play back



US 6,755,744 B1

7

thereof on the sound and video playback means of the jukebox 1, then deducts from the available credit balance an amount corresponding to the ordered selection. Finally the dialog module 10 sends a message which is interpreted by the graphic module 21 to allow the display of the welcome screen possibly with the amount of money available and the new number of credits for musical selections.

If the number of credits is equal to zero, the dialog module 10 sends a message interpreted by the graphic module 21 to display the payment screen previously described in such a way that validation of the selection is only confirmed if the user selects and validates a payment rule as described previously.

At any time, starting from the welcome screen, the user can actuate the activation means so as to switch the operating mode of the game machine 2 to the first operating mode corresponding to the original mode of the machine 2.

If the user selects the first operating mode by activating the activation means, the management module 21 initiates the notification means to send a notification of end of connection to the dialog module 10. Upon receipt of this notification, the dialog module 10 of the jukebox issues a termination message to the supervisor module 20 of the machine and switches the connection off. Upon receipt of this message, the supervisor 20 activates the second routine causing the cancellation of the tasks run by the graphic management module 21 and by the payment module 22 so as to activate again the original functions and tasks of the game machine 2. In the course of this shut down process, the module 22 for managing payment means transfers the total amount available, if it is different to zero, to a specific module for managing payments of the first operating mode. If the total available amount includes a residual virtual amount and a real amount, the calculation means of the module 22 for managing payment means, carries out the reverse conversion of the residual virtual amount into points and transfers the result of this conversion to a specific software module providing for operation of the game machine 2 according to the first mode. Similarly, the value of the number of credits usable for musical selections is stored, either in storage means of the game machine 2 by the module 22 for managing payment means, or in storage means of the juke box. In this latter case, the module 22 for managing payment means notifies, using notification means, the dialog module 10 of the juke box by indicating in a message, the value of the number of remaining credits and an identification of the game machine 2 issuing the notification. On receipt of this notification, the dialog module 10 stores the sent number 15 of credits, and links to it the identifier of the game machine 2 that issued it.

Finally, the selections made by the user and introduced into the queue with a view to playback thereof will be played back as if they had been chosen by using the user interface of the jukebox.

In an alternative embodiment, each electronic game machine 2 comprises an identification means in relation to the dialog module 10, so that, when the jukebox is connected to several game machines 2, it can asynchronously manage the communication with the various game machines 2. If a single game machine is connected to the jukebox, the identification of the game machine 2 enables the operating system of the jukebox to simultaneously manage the selection operations at the game machine 2 and those performed at its own interactive means.

The contents of the screens displayed on the viewing means of each game machine 2 are dependent not only on

8

the processing capacity of the viewing means of the game machine 2, but also on the maximum rate of data transfers authorized on the LAN. The higher the transfer rate, the better the display quality and quantity will be.

In another alternative embodiment, each electronic game machine 2 can comprise a statistics report module (not shown). This statistics report module includes collecting means for collecting information on the utilization of the game machine 2 when it is operating according to the first mode, i.e. according to its original operating mode. The information regarding the utilization of the game machine 2 is stored in the storage means of the machine 2, e.g. in a log file. The statistics report module includes a link with the notification means, so that the file or the statistical information contained in this log file is transmitted to the jukebox dialog module 10. The transmission of this information is initiated by the statistics report module, either at each connection of the game machine 2 on the LAN 3, or at regular intervals, or when the quantity of information to be transmitted reaches a determined threshold. When the dialog module 10 of the jukebox receives this information, it stores it in turn in its storage means in a log file. When the jukebox 1 logs on to a remote server 5, in order to update selection information or to send jukebox utilization data, the information regarding one or more game machines, contained in the jukebox log file can be transmitted on demand to the server to be used, e.g. for business purposes.

The utilization information of the game machine 2 is for instance the quantity of the amount of money entered into the game machine 2 when it is operating according to the first mode or, if the game machine 2 includes several games, the game most often chosen, or else other statistical information etc.

Also, the game machine 2 can contain an update management module enabling a remote server 5 to be used for updating the operating system of the game machine 2. For this purpose, the update information is first downloaded into the jukebox by announcing the identifier of the game machine 2 for which the update is meant. Then, the jukebox dialog module 10 can set up a connection with the update target game machine 2 in order to send the required information thereto. In another alternative embodiment, sending the update information is performed as soon as the game machine 2 notifies the dialog module 10 that it is connected.

We are now going to describe the communication method according to the invention with reference to FIG. 2.

The first step 301 of the method according to the invention consists of operating the activation means to switch operation of the game machine into the second mode. This activation initiates, in a second step 302, a set up of the connection between a game machine 2 and jukebox 1. This setting up consists of activating the jukebox dialog module 10 and the graphic management 21 and payment 22 modules of the game machine. Next, in a third step 303, a display made on the viewing means prompts a choice of a musical selection. The display step also comprises a step of collecting and/or calculating the amount of money available and possibly the remaining number of credits.

Several actions are possible on the part of the user. Consequently, the machine is standing by for a user interaction.

Hence, in a first case, the machine is waiting, in a fourth step 304, for the user to validate a payment procedure by acting on the interactive means of the game machine 2. If such is the case, a payment screen is displayed in a fifth step 305. As previously explained, this payment screen com-

US 6,755,744 B1

9

prises the list of available payment rules. Next the machine waits, in a sixth step 306, for the user to insert a means of payment (coin, ticket, credit card etc.) The insertion of a means of payment causes, in a seventh step 307, a notification to be sent to the jukebox containing information representative of the detected amount. The jukebox responds to this notification by sending the game machine a message that permits modification of the payment screen in order to display, in accordance with the fifth step, the new amount available and possibly the new rules of payment available. As soon as the user inserts a means of payment, the seventh step and a return to the display 305 of the payment screen is carried out. In an eighth step 308, the machine 2 waits for the user to select a payment rule and/or a means of validation such as a virtual button on the payment screen in order to return to the welcome screen. If a payment rule is selected before the selection of the means of validation, in a ninth step 309 the graphic management module 21 sends, to the dialog module 10, a notification representative of the payment rule selected by the user. In this ninth step 309, and on receipt of this notification, the dialog module 10 increases the number of credits and reduces the amount available and then sends a message to the graphic module in order to display, in accordance with the third step 303, the welcome screen with the new credit values and the amount available. If no payment rule is selected, before the selection of the means of validation, the graphic management module 21 notifies it to the dialog module 10, by indicating to it that no payment rule has been selected. On receipt of this notification, the module again carries out the third step 303 of displaying the welcome screen.

If triggering of the payment procedure, as previously defined, is not carried out, while the welcome screen is displayed, in a tenth step 310, the machine waits for insertion of a means of payment. If a sum of money is inserted into the machine 2, in an eleventh step 311, a notification generated by the module 22 managing the payment means and containing information representative of the amount detected, is sent to the dialog module 10 of the juke box. The dialog module 10 of the juke box responds, in the eleventh step 311, to this notification by sending to the game machine, a message permitting modification of the welcome screen to display, in accordance with the third step 303, the new amount available.

If no sum of money is detected, during display of the welcome screen in the third step 303, the machine awaits, in a twelfth step 312, activation of the activation means in order to switch the operation of the game machine from the second mode (juke box interface mode) to the first mode (original mode of the game machine). If this activation is detected, a thirteenth step 313 is triggered in which the tasks specific to the choice and to the payment for the selections on the game machine are closed by the dialog module and the connection between the juke box and the game machine 2 is broken. The thirteenth step also comprises the transfer, by the module 22 for managing the payment means, to the specific means of the game machine, of the remaining amount available and unused at the time of switching over to first mode.

During display of the third step 303, the user may, in a fourteenth step 314 use the interactive means to choose a musical selection. When the selection made has been validated by the user, the graphic management module 21 notifies the dialog module 10 of information representing the identification of the selection made. Upon receipt of this notification, in a fifteenth step 315, the dialog module 10 checks whether the credit balance is equal to zero.

10

If the credit balance is zero, the method according to the invention triggers the payment procedure through a fifth step 305. The procedure is identical, except for the fact that after the eighth step 308 of the payment procedure, the dialog module 10 is notified by the module 22 for managing payment means in order, in a sixteenth step 316, to insert the selection made and validated, into a queue of selections to be played back, and in order to deduct a credit from the total number of credits. Next, the dialog module 10 sends a message causing a return to the third step 303 of displaying the welcome screen with an update of the number of credits.

If, in the fifteenth step 315, the credit balance is different from zero, the dialog module 10, in the sixteenth step 316, inserts the chosen and validated selection into a queue of selections to be played back and deducts a credit from the total number of credits. Next, the dialog module 10 sends a message causing a return to the third step 303 of displaying the welcome screen with an update of the number of credits.

Thus, the communication device according to the invention is characterized in that each electronic game machine 2 is connected to the playback system 1 via a network interface 23 and an associated LAN 3 and comprises specific means 22 for managing the means of payment, specific means 21 for managing the viewing means, and the interactive means, in order to enable, on the electronic game machine 2, the selection of payment for at least one selection stored on the playback system 1 with a view to playback thereof on the playback system, the specific means 22 of managing the payment means and the specific means 21 of managing the viewing means and the interactive means being triggered by the activation means of the electronic game machine 2.

In another embodiment, the playback system 2 comprises a means 11 communicating with the communication interface 23 of each electronic game machine 2, a specific module 10 for managing messages coming from each electronic game machine 2.

In another embodiment, each electronic game machine 2 comprises identification means enabling differentiation at the playback system 1.

In another embodiment, the playback system 1 comprises means 13 communicating with a remote centralized server 5.

In another embodiment, each electronic game machine 2 comprises a storage means allowing to store information regarding the utilization of the electronic game machine.

In another embodiment, the specific means 22 of managing the payment means comprise means of calculating the amount available to pay for the songs, firstly from a sum of money inserted by the user into the electronic game machine 2, secondly from a remaining amount of money inserted into the game machine 2 before triggering of the specific means 20, 21, 22 of management and thirdly from a number of game points accumulated before triggering of the specific management means 20, 21, 22.

Also, the communication method is characterized in that it comprises the steps of:

- activating 301 specific management means of an electronic game machine 2 so as to change the original operating mode of the electronic game machine 2 into a mode implementing the following steps of:
  - setting up a connection 302 between the playback system and the electronic game machine;
  - transferring 303, 304 graphic dialog screens, from the playback system to the electronic game machine 2,
  - prompting a user to make a musical selection or to trigger a payment step;



US 6,755,744 B1

11

choosing 308 a musical selection  
 paying for 315 the chosen selection  
 playing back the chosen selection through the playback  
 system 1.

In another embodiment, the payment step comprises:

a step of calculating the amount available from the  
 remaining amount unused by the game machine and the  
 sum of money inserted into the payment means of the  
 game machine, by the user,

a step of selection and validation by the user of a payment  
 rule to determine the number of selections to be chosen.

In another embodiment, the calculation step comprises a  
 step of converting a number of game points accumulated  
 during use of the game machine, in accordance with its  
 original operation, into an amount available.

In another embodiment, the method includes a step of  
 updating at least one electronic game machine 2 comprising  
 the steps of:

transferring, from a remote server 5, update information  
 regarding at least one given electronic game machine 2,  
 onto the playback system connected to the server via a  
 WAN;

setting up a connection between the playback system and  
 each given electronic game machine 2,

sending update information on each given electronic  
 game machine 2.

In another embodiment, the method includes the steps of:  
 storing on each electronic game machine 2 information  
 concerning utilization thereof,

transferring information regarding the utilization of the  
 electronic game machines 2 to the playback system,  
 then from the playback system to a remote server 5  
 where the playback system is connected via a WAN.

In another embodiment, the step of making a selection is  
 followed by a step of reducing the credit and the two steps  
 are iterated until the credit is used up.

It should be obvious for people skilled in the art that the  
 invention allows for embodiments of numerous other spe-  
 cific forms without departing from the field of application of  
 the invention as claimed. Consequently, the present embodi-  
 ments are to be considered by way of example, but can be  
 modified within the field defined by the scope of the  
 appended claims. In particular, the description made with  
 reference to the selection of a song may equally well be  
 applied to the selection of a work other than a musical work,  
 for example a film, text of a novel or any other audio-visual  
 work.

What is claimed is:

1. A communications device for providing communica-  
 tions between an information playback system and at least  
 one electronic game machine, each electronic game machine  
 comprising a viewing means, a means for interacting with a  
 user and a means of payment, wherein each electronic game  
 machine is connected to the playback system via a network  
 interface and associated LAN, the communications device  
 comprising:

means for managing the means of payment;

means for managing the viewing means; and

interactive means to enable, on the electronic game  
 machine, selection of and payment for at least one  
 selection stored on the playback system, said selection  
 being intended to be played back on the playback  
 system, the means for managing the payment means  
 and the means for managing the viewing means and the  
 interactive means being triggered by activation means  
 of the electronic game machine.

12

2. A communication device according to claim 1, wherein  
 the playback system comprises a means for communicating  
 with the communication interface of each electronic game  
 machine; and a module for managing messages coming from  
 each electronic game machine.

3. A communication device according to claim 1 wherein  
 each electronic game machine comprises an identification  
 means allowing a differentiation at the playback system.

4. A communication device according to claim 1, wherein  
 the playback system comprises a means for communicating  
 with a remote centralized server.

5. A communication device according to claim 1, wherein  
 each electronic game machine comprises a storage means  
 for storing information regarding a utilization of the elec-  
 tronic game machine.

6. A communication device according to claim 1, wherein  
 the means for managing the means of payment comprises  
 means for calculating an amount available to pay for songs  
 from at least one of: a sum of money inserted by the user into  
 the electronic game machine, from a residual sum of money  
 inserted into the game machine before triggering of the  
 means for managing the means of payment, means for  
 managing the viewing means or interactive means, and from  
 a number of points accumulated before triggering of at least  
 one of the means for managing the means of payment,  
 means for managing the viewing means and the interactive  
 means.

7. A method of communicating between an audiovisual  
 information playback system and at least one electronic  
 game machine, each said electronic game machine compris-  
 ing a viewing means, a means for interacting with a user, and  
 a means of payment, the playback system being connected  
 to each electronic game machine via a LAN, the method  
 comprising:

activating management means of an electronic game  
 machine to change an original operating mode of the  
 electronic game machine implementing the following  
 steps:

setting up a connection between the playback system and  
 the electronic game machine;

transferring graphic dialog screens from the playback  
 system to the electronic game machine to prompt the  
 user to make a musical selection or to trigger a payment  
 step;

making the musical selection;

paying for the musical selection made;

playing back, by means of the playback system, the  
 selection made.

8. A method of communication according to claim 7,  
 wherein the step of paying for the musical selection com-  
 prises:

calculating an amount available from a remaining amount  
 unused by the game machine and a sum of money  
 inserted into the payment means of the game machine  
 by the user; and

selection and validation by the user of a payment rule to  
 determine a number of selections to be chosen.

9. A method of communication according to claim 8,  
 wherein the step of calculating comprises converting a  
 number of game points accumulated during use of the game  
 machine in accordance with the original operation mode of  
 the game machine, into the amount available for paying for  
 the musical selection.

US 6,755,744 B1

13

10. A method of communication according to claim 7  
further comprising a step of updating said at least one  
electronic game machine, the step of updating comprising:  
transferring update information regarding said at least one  
given electronic game machine from a remote server 5  
onto the playback system connected to the server via a  
WAN;  
setting up a connection between the playback system and  
each said given electronic game machine; and 10  
sending said update information on each given electronic  
game machine.

14

11. A method of communication according to claim 7  
further comprising:  
storing on each said electronic game machine information  
relating to utilization of the electronic game machine;  
and  
transferring information regarding the utilization of the  
electronic game machines to the playback system, then  
from the playback system to a remote server, the  
playback system being connected via a WAN.

\* \* \* \* \*

# **Exhibit D**



US005930765A

**United States Patent** [19]**Martin**[11] **Patent Number:** **5,930,765**[45] **Date of Patent:** **Jul. 27, 1999**[54] **DOWNLOADING METHOD FOR SONGS AND ADVERTISEMENTS**[76] Inventor: **John R. Martin**, 5635 Nebeshonee La., Rockford, Ill. 61103

[21] Appl. No.: 08/975,612

[22] Filed: **Nov. 21, 1997****Related U.S. Application Data**

[63] Continuation-in-part of application No. 08/638,022, Apr. 25, 1996, Pat. No. 5,848,398, which is a continuation-in-part of application No. 08/584,253, Jan. 11, 1996, Pat. No. 5,781,889, which is a continuation of application No. 08/268,782, Jun. 30, 1994, abandoned, which is a division of application No. 07/846,707, Mar. 6, 1992, Pat. No. 5,355,302, which is a continuation-in-part of application No. 07/538,981, Jun. 15, 1990, abandoned.

[51] Int. Cl.<sup>6</sup> ..... **G06F 17/60**[52] U.S. Cl. .... **705/14; 364/479.04; 395/200.61; 463/42**[58] **Field of Search** ..... **705/1, 10, 14, 705/16; 395/200.47, 200.46, 200.49, 200.68, 200.61; 235/381; 364/479.01-479.06; 463/40-43**[56] **References Cited****U.S. PATENT DOCUMENTS**

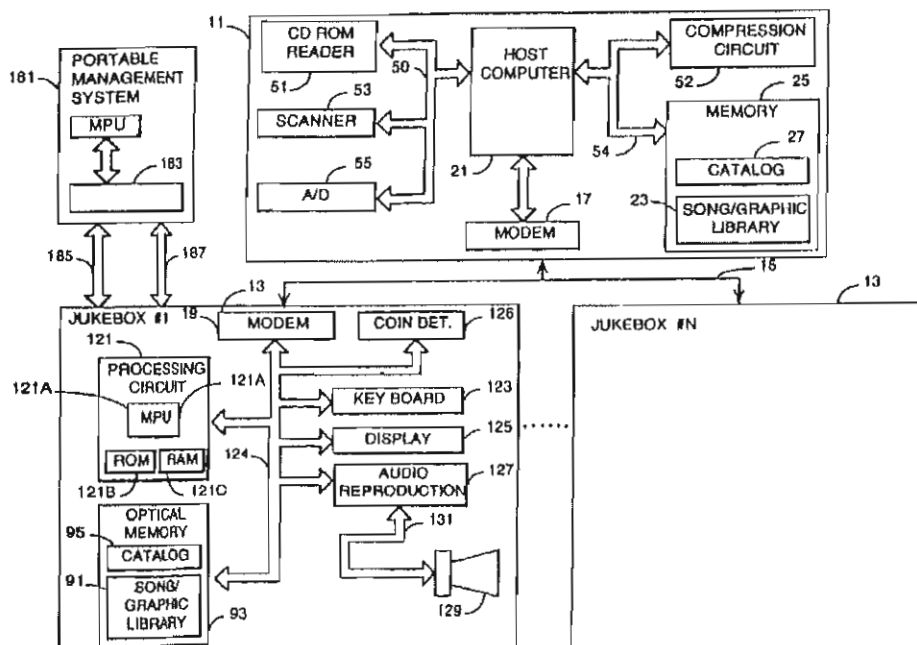
4,860,201	8/1989	Stolfo et al.	395/800.11
4,956,768	9/1990	Sidi et al.	395/873
5,191,573	3/1993	Hair	369/84

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2193420 2/1988 United Kingdom.

*Primary Examiner*—Allen R. MacDonald*Assistant Examiner*—Hani M. Kazimi*Attorney, Agent, or Firm*—McAndrews, Held & Malloy, Ltd.[57] **ABSTRACT**

The present invention provides a method of updating electronic data stored in numerous electronic amusement devices. The method includes the steps of providing a master information source from which new songs, programs, or other information, for example, advertisements, may be downloaded. The method also includes the steps of providing a first set of at least one non-updated electronic amusement device, connecting each non-updated electronic amusement device in the first set to the master information source and downloading information to the non-updated electronic amusement device, thereby providing at least one updated electronic amusement device. Additional non-updated electronic amusement devices may be updated according to the method by providing a second set of at least one non-updated electronic amusement device, and iterating the following steps: selecting an updated electronic amusement device, selecting a subset of the second set of at least one non-updated electronic amusement devices, connecting the selected updated electronic amusement device to each non-updated electronic amusement device in the selected subset, and downloading information to the non-updated electronic amusement devices, thereby providing at least one additional updated electronic amusement device. The additional updated electronic amusement devices may then be chosen in subsequent iterating steps to update non-updated electronic amusement devices.

**30 Claims, 6 Drawing Sheets**

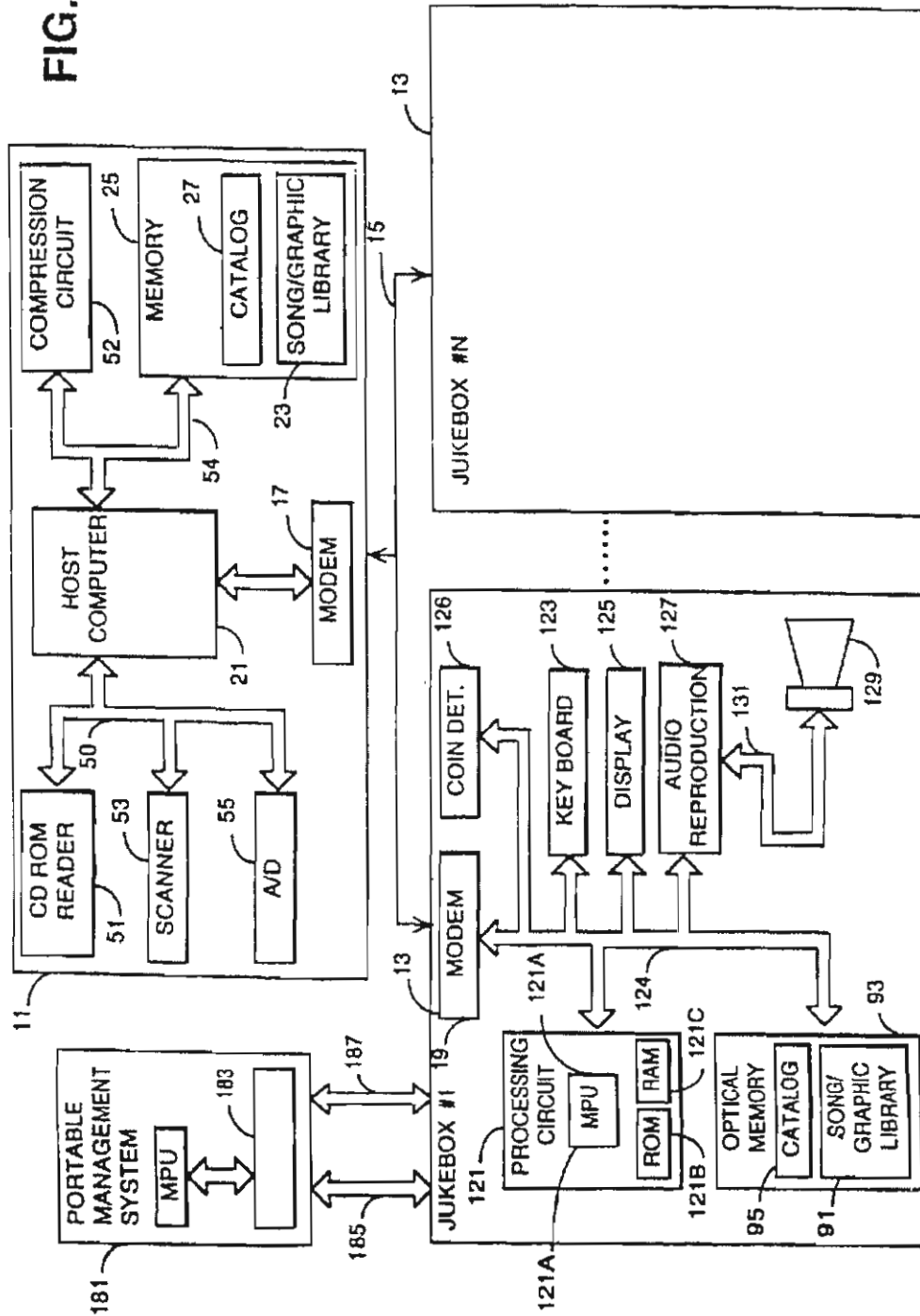
U.S. Patent

Jul. 27, 1999

Sheet 1 of 6

5,930,765

FIG. 1





U.S. Patent

Jul. 27, 1999

Sheet 2 of 6

5,930,765

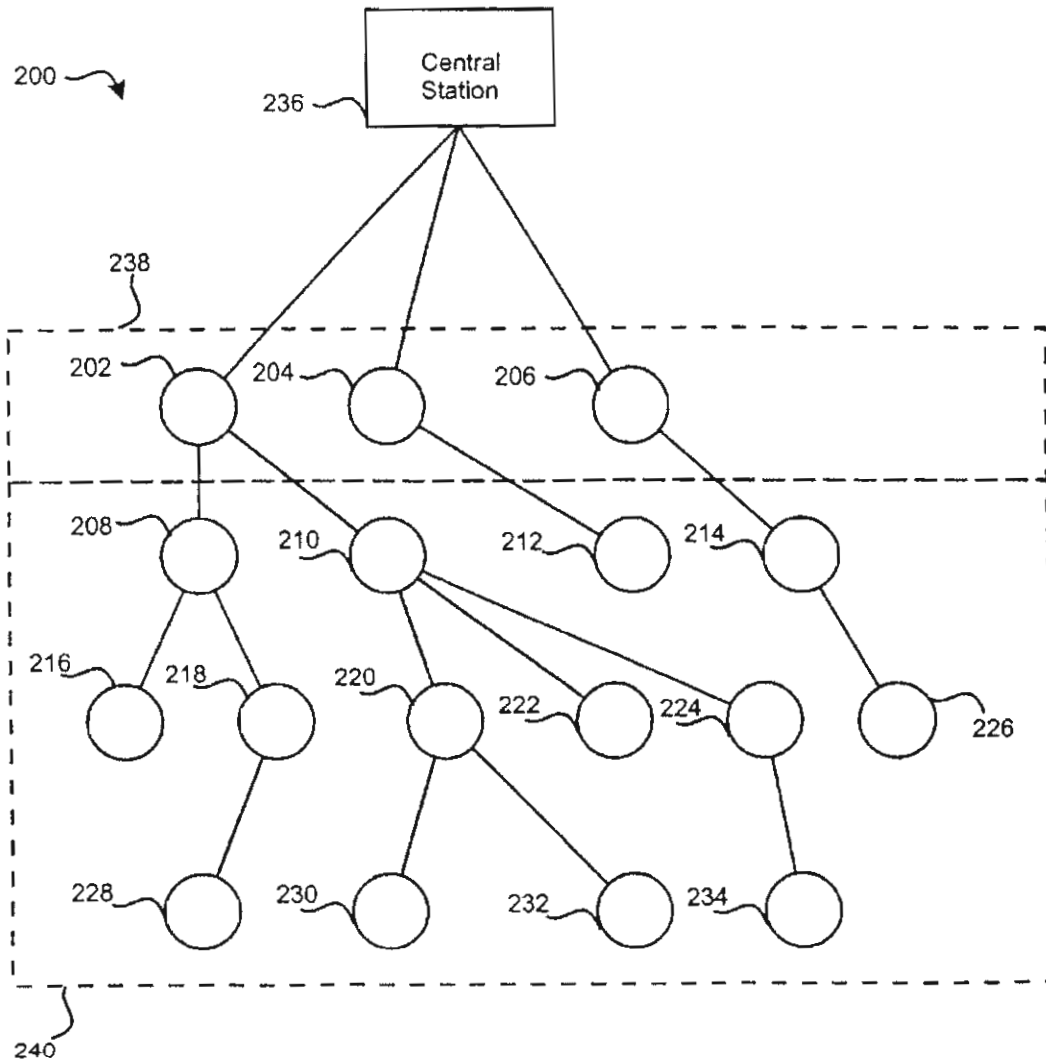


Figure 2

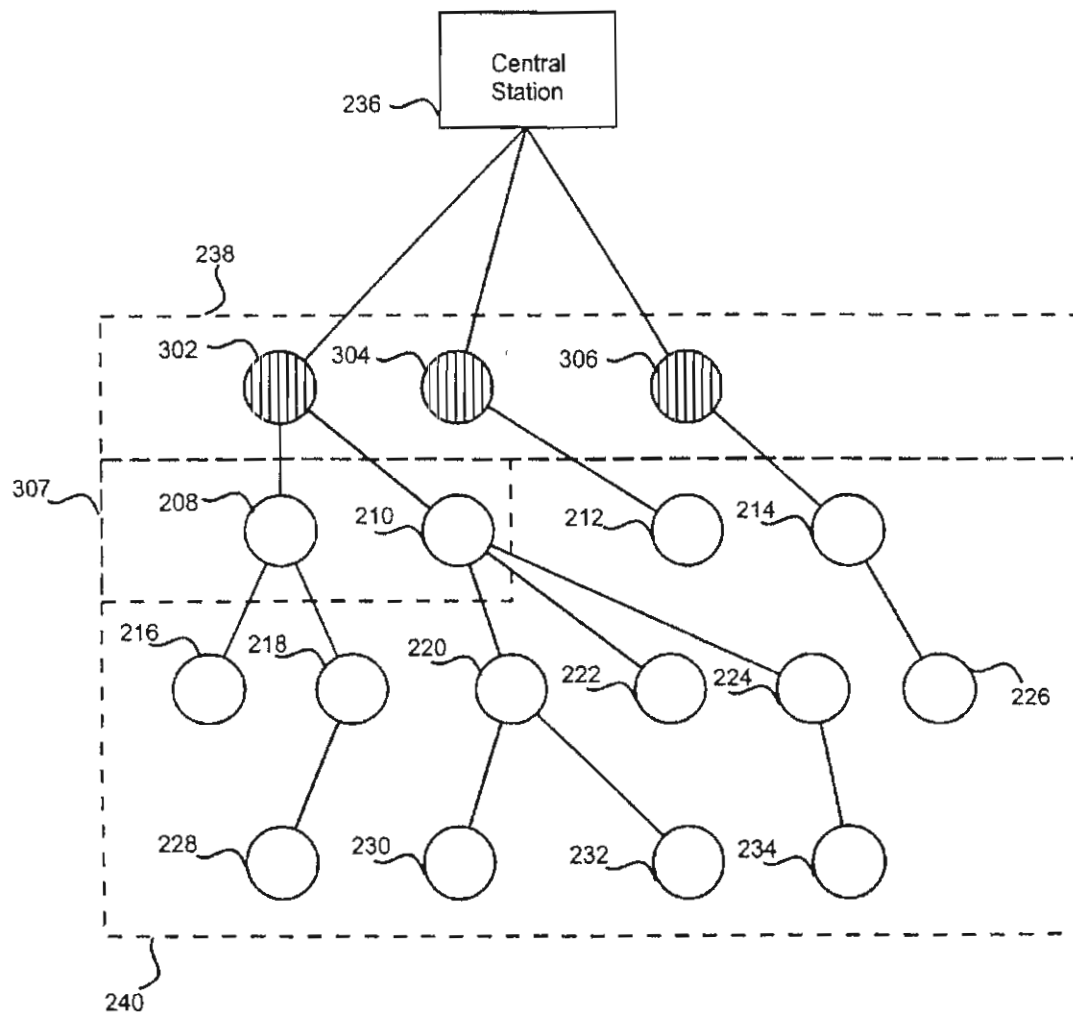


Figure 3

U.S. Patent

Jul. 27, 1999

Sheet 4 of 6

5,930,765

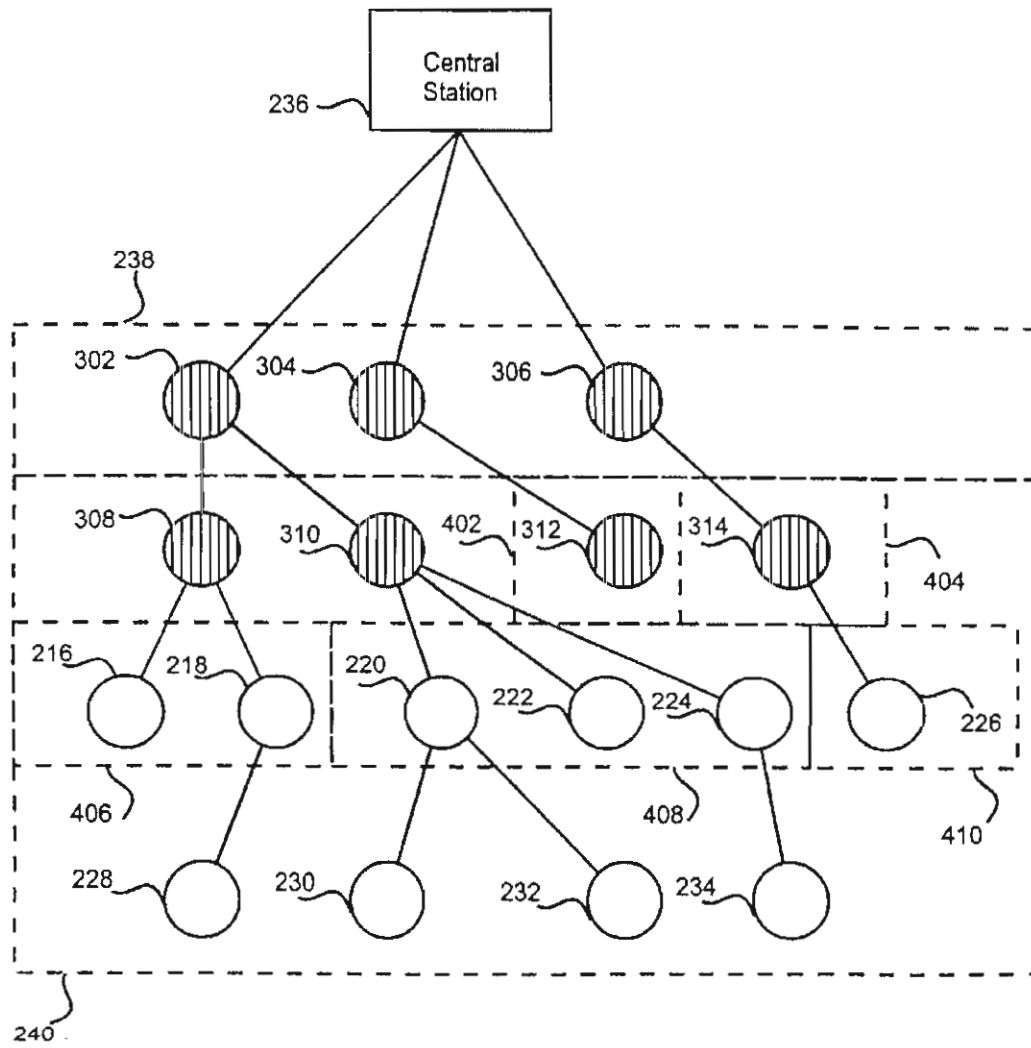


Figure 4

**U.S. Patent**

Jul. 27, 1999

Sheet 5 of 6

**5,930,765**

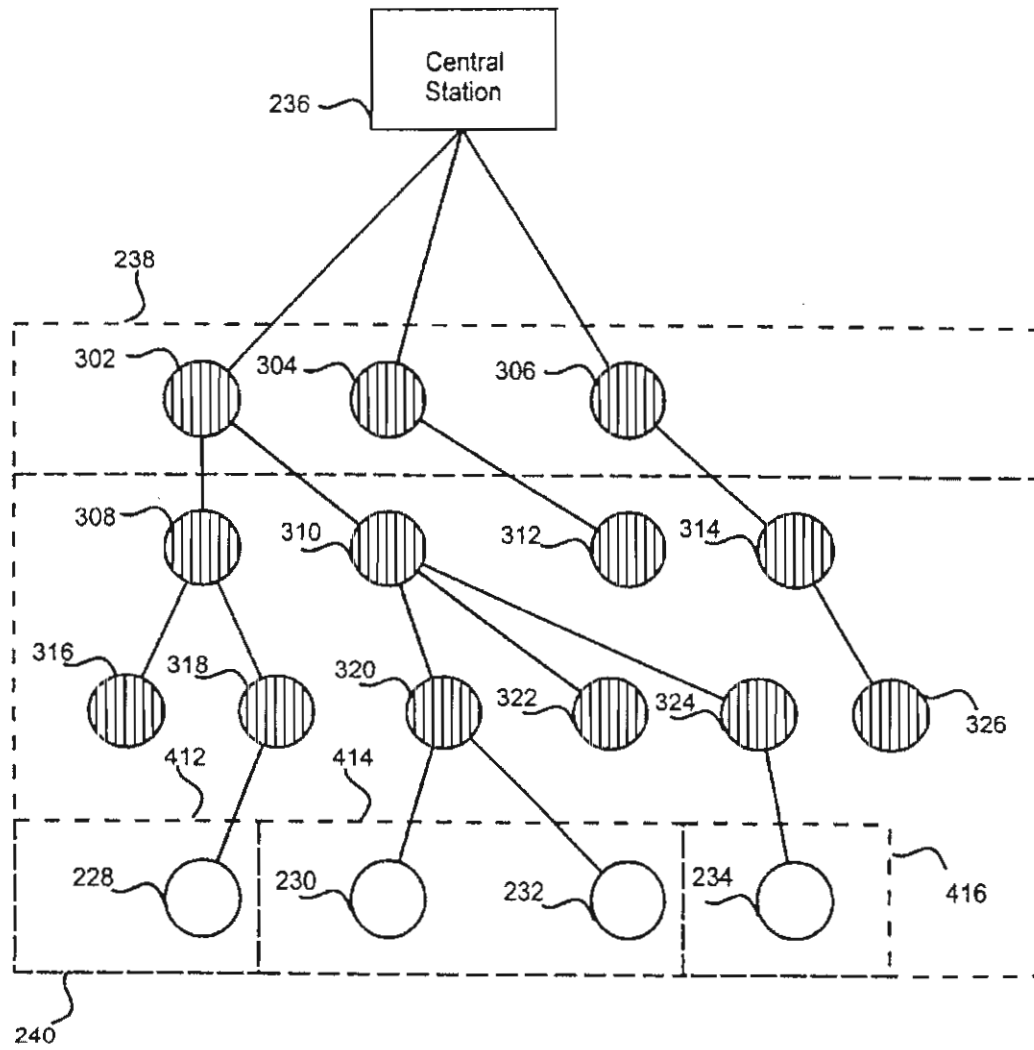


Figure 5

U.S. Patent

Jul. 27, 1999

Sheet 6 of 6

5,930,765

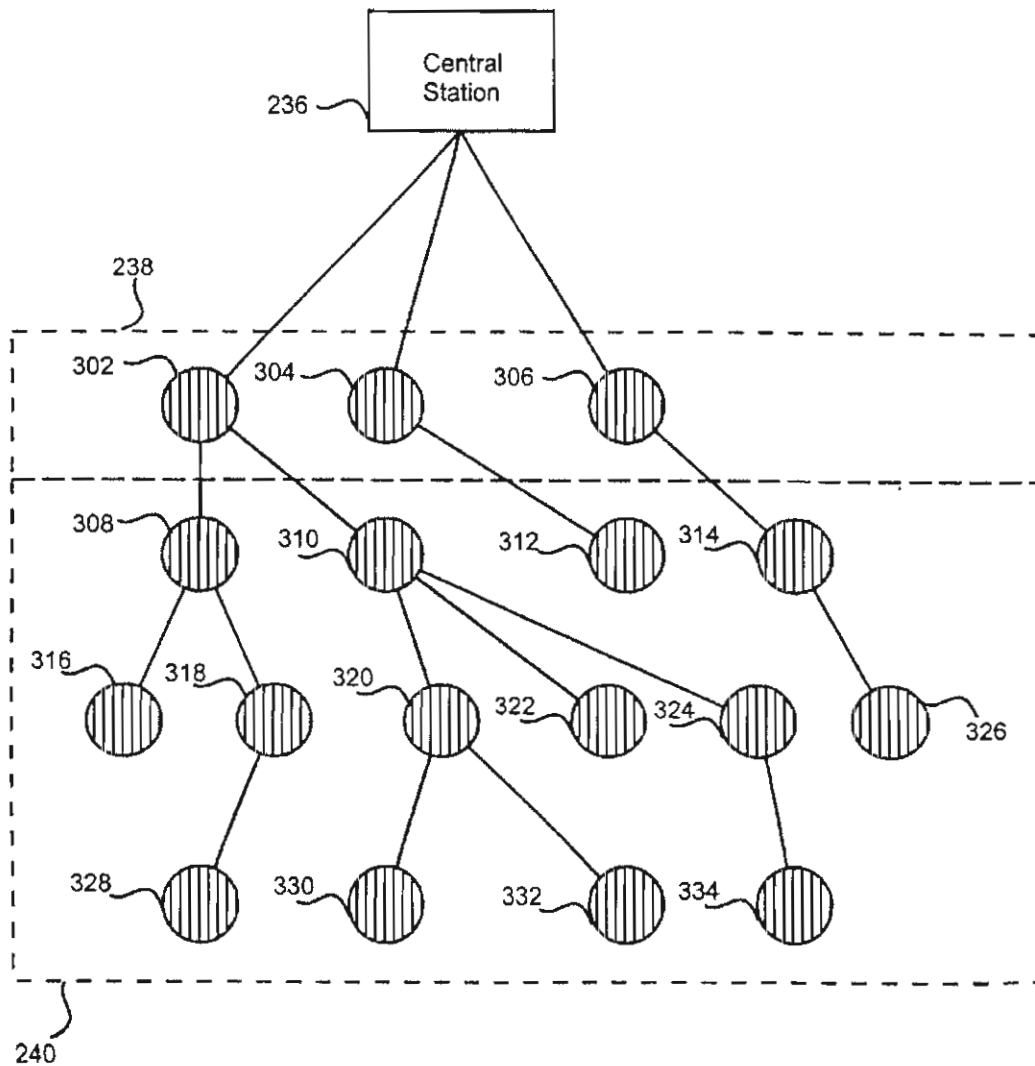


Figure 6

5,930,765

1

## DOWNLOADING METHOD FOR SONGS AND ADVERTISEMENTS

### CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a Continuation In Part of application Ser. No. 638,022 filed Apr. 25, 1996, now issued U.S. Pat. No. 5,848,398, which is a Continuation In Part of application Ser. No. 584,253 filed Jan. 11, 1996 now U.S. Pat. No. 5,781,889 which is a Continuation of application Ser. No. 268,782 filed Jun. 30, 1994, now abandoned, which is a Divisional of application Ser. No. 846,707 filed Mar. 6, 1992, now issued U.S. Pat. No. 5,355,302, which is a Continuation In Part of application Ser. No. 538,981 filed Jun. 15, 1990, now abandoned.

### STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable.

### BACKGROUND OF THE INVENTION

Electronic amusement devices, including jukeboxes, have been available for many decades. One feature of modern jukeboxes that has carried forward from the earliest machines is the ability to browse through a selection of songs and select one for play. Although it would not be uncommon to find a jukebox able to provide a selection of one hundred or more songs, or even complete compact discs (CDs), the benefits of providing an increased number of selections is counterbalanced by a unique set of difficulties.

One set of difficulties lies in initially installing, then updating the set of songs available in the jukebox. Currently, the songs played by modern jukeboxes are stored on CDs in the jukebox. Typically, a significant amount of time, expense, and potential inadvertent mishandling of CDs (or the amusement device itself) are incurred because the CDs are initially installed manually. The time, expense, and mishandling costs are then incurred each time new CDs become available and the old CDs are exchanged out for the new CDs.

Furthermore, it is difficult to predict the artists, titles, or timing of songs that may become popular. As a result, profits may be lost until the time consuming process of obtaining and replacing the CDs is carried out. Because of the unpredictability of popularity, changing CDs manually may become a significant drain on resources.

The difficulties described about with respect to changing CDs is not the only difficulty inherent with electronic amusement devices. In electronic dart games, for example, there are usually no CDs to change, but there may be electronic music, advertisements, or other displays that need to be updated on a regular or irregular basis. These electronics amusement devices also incur the substantial time, expense, and mishandling costs associated with changing CDs in a jukebox. As an example, an electronic dart game may include a sound ROM that would have to be swapped in order to update the music or other sounds associated with the dart game, or advertisements displayed on the dart game. In addition, an operator responsible for maintaining a large number of electronic amusement devices suffers the costs described above many times over. Large operations may further require hiring additional labor, purchasing additional CDs (or updating advertisements), and coping with inadvertently broken amusement devices.

2

U.S. Pat. No. 5,355,302 to Martin, et al. (hereby incorporated by reference in its entirety), discloses a system for managing a plurality of computer jukeboxes. In Martin, a central station is provided from which jukeboxes may download musical recording data. The central station may also receive data, for example, usage data, transmitted by each jukebox. At present, downloading a typical compressed musical recording or song over a phone line with a MODEM at approximately 28.8 Kbps may take as long or longer than 30 minutes. Therefore, if there are many jukeboxes that retrieve songs from the central station, the phone line may be in use for extended periods of time. As a result, some jukeboxes may not be able to reach the central station in order to download songs and it may take an inordinate amount of time to update all the jukeboxes.

A need exists in the industry for an improved downloading method for songs and advertisements which updates electronic amusement devices and overcomes the disadvantages discussed above and previously experienced.

### BRIEF SUMMARY OF THE INVENTION

It is an object of the present invention to provide an improved method for expeditiously and inexpensively downloading updates to songs, advertisements, sounds, or other information to a plurality of electronic amusement devices where the devices may be remotely located with respect to each other.

A further related object of the present invention is to provide an improved method of allowing automatic updates to occur in a highly efficient manner to data stored in a plurality of electronic amusement devices which may be remotely located with respect to each other.

It is yet another object of the present invention to provide a method making possible a centralized distribution for updating information in electronic amusement devices, which method reduces the expenses associated with updating information in an electronic amusement device.

It is another object of the present invention to provide an improved method for downloading songs and other information making possible a configurable update path for information in electronic amusement devices.

It is a further object of the present invention to provide an improved method for downloading updates to songs and other information to a plurality of remotely located electronic amusement devices in an efficient, inexpensive, and configurable manner.

More specifically, the present invention provides an improved downloading method for updating electronic data stored in numerous electronic amusement devices. The improved method includes the steps of providing a master information source from which new songs, programs, or other data, for example, advertisements, may be downloaded. The improved method also includes the steps of providing a first set of at least one non-updated electronic amusement device, connecting each non-updated electronic amusement device in the first set to the master information source, and downloading information to the non-updated electronic amusement device, thereby providing at least one updated electronic amusement device.

Additional non-updated electronic amusement devices may then be updated according to the improved method by providing a second set of at least one non-updated electronic amusement device, and iterating the following steps: selecting an updated electronic amusement device from the first set, selecting a subset of the second set of at least one non-updated electronic amusement devices, connecting the



5,930,765

3

selected updated electronic amusement device to each non-updated electronic amusement device in said selected subset, and downloading information to the non-updated electronic amusement devices, thereby providing at least one additional updated electronic amusement device. The additional updated electronic amusement devices may then be chosen in subsequent iterating steps (i.e., they may be considered to be members of the first set of updated electronic amusement devices) to continue to update non-updated electronic amusement devices.

The iterating steps described above may be repeated until the method has updated each non-updated electronic amusement device. Alternatively, the method may terminate after a predetermined number of iterations, and continue from where it left off at a later time or date. It is noted that an updated electronic amusement device need not connect to the same subset of non-updated electronic amusement devices each time the method is invoked. Rather, an updated electronic amusement device may choose freely from among the second subset of non-updated electronic amusement devices. Furthermore, the updated electronic amusement devices may select non-updated electronic amusement devices according to virtually any criteria. For example, the non-updated electronic amusement devices may be selected according to the area code in which they are located, by type (for example, dart game, jukebox, or trivia game), or by the amount of time required to perform the update.

In general, the method described above allows the electronic amusement devices to be setup in a tree configuration (where the electronic amusement devices represent nodes in the tree). The tree configuration may have any number of levels, and any number of branches from the nodes at each level. The tree configuration allows multiple nodes to simultaneously update other nodes, and therefore may download information very efficiently.

Other objects, features, and advantages of the present invention will be readily apparent from the following description of certain preferred embodiments thereof taken in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the disclosure.

#### BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

FIG. 1 illustrates a block diagram of an electronic amusement device suitable for use with the present invention.

FIG. 2 shows the connections between a first set and a second set of non-updated electronic amusement devices and a central station.

FIG. 3 shows a first set of updated electronic amusement devices connected to a second set of non-updated electronic amusement devices and a central station.

FIG. 4 shows the results of an iteration of the updating method according to the present invention starting from the configuration of FIG. 3.

FIG. 5 shows the results of an iteration of the updating method according to the present invention starting from the configuration of FIG. 4.

FIG. 6 shows the results of an iteration of the updating method according to the present invention starting from the configuration of FIG. 5.

#### DETAILED DESCRIPTION OF THE INVENTION

Turning now to FIG. 1, a central station 11 monitors and updates the available selection of music, advertisements, or

4

other information at a number of electronic amusement devices such as jukebox 13. For example, the central station 11 may monitor each jukebox 13 to determine the number of times each song has been played. From these numbers, the central station 11 can calculate the royalty payments that are due. More importantly, the central station 11 can identify those songs which need to be replaced in each jukebox 13 on an individual basis, the central station 11 communicating replacement songs to each jukebox 13 to update the available music selection as needed.

Each jukebox 13 generally includes a computer having sophisticated audio production capability wherein each jukebox 13 is programmed to play songs that have been digitally compressed and stored in a large volume data storage unit 93. The storage unit 93 may be implemented, for example, with a hard disk, an optical memory, or any other available nonvolatile computer memory that provides read access for playing songs or that provides read and write access for playing songs and storing new songs.

The central station 11 communicates with each jukebox 13 via a transmission link 15. The central station 11 and each jukebox 13 use respective modems 17 and 19 to maintain communication on the transmission link 15. The transmission link 15 may be a cable system such as a public or private telephone or the like. However, the modems 17 and 19 may be replaced with RF transceivers and associated antenna. In the later instance, the transmission link 15 is an RF link.

Specifically, the central station 11 includes a host computer 21 which maintains a master library 23 of songs and optionally associated graphics which are stored in a compressed digital form in a bulk storage unit 25. The bulk storage unit 25 is capable of storing vast amounts of digital data, and may, for example, take the form of a read-write optical storage device, a hard disk, or a solid state memory. The host computer 21 indexes the master library 23 by using a master catalog 27 which is also maintained in the bulk storage unit 25.

The master catalog 27 stores a song record 29 for each song stored in the master library 23. Each song record may include information fields including, for example: a) a title field, containing the name of the song; b) a classification field, containing the type of music, i.e., country, pop, jazz, classical, etc.; c) a song address field, containing the beginning address in the bulk storage unit 25 of the compressed digital data of the song; d) a song size field, containing the length in bytes of the compressed digital data; e) a graphics address field, containing the beginning address in the bulk storage unit 25 of the compressed digital data of graphics images, if any, to be associated with the song; f) a graphics size field, containing the number length in bytes of the compressed graphics image; and g) a play count field, containing a count which indicates the number of times the associated song has been played.

Each jukebox 13 plays songs and optionally displays graphics which are stored locally in the large-volume data storage unit 93. The storage unit 93 of the jukebox 13 contains a subset of the songs found in the master library 27 maintained by the central station 11. More specifically, the storage unit 93 of the jukebox 13 stores a song library 91 which is a corresponding subset of the master library 27. The song library 91 contains all of the currently available song selections and associated pictorial graphics, if any, for the jukebox 13. The storage unit 93 also stores a catalog 95 that is similar to the master catalog 23. Both the song library 91 and the associated catalog 95 are monitored and updated by

5,930,765

5

the central management system 11 as needed via the transmission link 15.

The jukebox 13 also includes a processing circuit 121 which contains a microprocessor 121A, read only memory (ROM) 121B and random access memory (RAM) 121C. As in conventional computer systems, the microprocessor 121A operates in accordance with the software contained in ROM 121B and uses the RAM 121C, for example, for scratchpad memory. The processing circuit 121 may also contain a decompression algorithm which decompresses any compression applied by the central station 11.

The processing circuit 121 controls the operation and flow of data into and out of the jukebox 13 through the modem 19 via a bus 124. Using the bus 124, the processing circuit 121 also controls a visual display 125, one or more selection keys 123, and a coin/bill detector 126 to provide the user with an interactive interface to the jukebox 13. The keys 123 provide signals representing user inputs such as displayed song selection. A touchscreen (not shown) may also provide user inputs by providing a feedback mechanism to song selection graphics, song playing controls, or other information displayed on the visual display 125.

The display 125 displays alpha numeric information as well as pictorial graphics to interface with the user. The coin/bill detector 126 is responsive to one or more coins or bills input by a customer to determine whether the proper amount of money has been input and to provide money detect signals coupled to the processing circuit. The processing circuit 121 further controls, via the bus 124, an audio reproduction circuit 127 coupled to a speaker system 129 along a bus 131 to provide an audio output to the user.

Turning now to FIG. 2, a configuration 200 of electronic amusement devices 202-234 connected to a central station 236 is shown. The central station 236 may be implemented, for example, as the management system 11 shown in FIG. 1. The amusement devices may be implemented, for example, as the computer jukebox 13 shown in FIG. 1, or may be configured as dart games, electronic trivia games, and the like. The connections between the central station 236 and the amusement devices 202-234 are typically implemented as a MODEM connection over a telephone line but may include other forms of communication. The connections may be implemented, for example, as an Integrated Services Digital Network (ISDN) connection or as a general network connection, for example, a Synchronous Optical Network (SONET) or Ethernet connection, optionally connected to the Internet. Other suitable implementations for the connections include serial or parallel data buses, satellite connections, microwave transmissions, or even cable television connections.

Under the operation of the processing circuit 121 or the host computer 21, the central station 236 or the amusement devices 202-234 may schedule regular or irregular data transfer operations (downloads) between the amusement devices 202-234 and the central station 236 (most commonly song updates for the amusement devices 202-234). Information, for example, song selection information, may also flow from the amusement devices 202-234 to the central station 236. External input devices such as keyboards, touchscreens, mice, and scanners (not shown) may be used to control the amusement device 202-234 updates. In addition, timers, implemented as, for example, real time clocks, may be used to schedule periodic amusement device 202-234 updates.

For example, when a new song becomes popular, the central station 236 may retrieve the song from its storage and

6

transmit the song to selected amusement devices in order to replace an old song no longer popular. The central station 236 may also send advertisements, program updates, or other information to receivers. For example, the central station 236 may send a new advertisement to a receiver in a dart game for display on a screen included in, or connected to, the dart game itself. The advertisement need not be visual in nature. It may be solely audio, or it may include both audio and visual elements for output on a multimedia display. The multimedia display may therefore include, for example, only speakers, or may include additional elements including video screens. The method of the present invention controls the updates to the numerous amusement devices 202-234 in an efficient manner. In particular, the method of the present invention does not require the central station 236 to transmit to every amusement device 202-234 in order to update each amusement device 202-234.

According to the method of the present invention, a first set of amusement devices is selected. Referring to FIG. 2, a first set 238 of the amusement devices 202-234 consisting of amusement devices 202-206 is shown selected as the first set 238. The amusement devices in the first set 238 are all capable of directly connecting to the central station 236 through one of the communications links described above. In principle, any number of amusement devices 202-206 may be connected directly to the central station 236. Furthermore, the selection of the first subset need not include every amusement device connected directly to the central station 236. The amusement devices 208-234 which are not included in the first subset 238 may be considered to form a second set 240 of amusement devices.

Once the first set 238 has been chosen, each amusement device in the first set 238 connects to the central station 236. Once connected, the amusement devices, for example amusement device 202 transfers (downloads) data from the central station 236. The downloaded data may, for example represent a new song, advertisement, or other information. Storage in the amusement device may be implemented, for example, as a writeable-CD, re-writeable CD, disk drive, tape drive, EEPROM, or flash memory. In general, the storage may hold any type of electronic information, including digitized songs, static images, image sequences (video), and sounds suitable for advertisements, attractive displays, or other information (such as weather updates). The amusement device may also transfer program updates (for example, bug fixes) designed to update the software in an electronic amusement device.

After transferring the data, the amusement device is considered an updated amusement device. Referring to FIG. 3, that figure indicates with a hatching pattern that the amusement devices 302-306 are updated versions of the amusement devices 202-206 of FIG. 2. The subsequent steps in the method of the present invention allow any updated electronic amusement device to, in turn, update any non-updated amusement devices. First, an updated electronic amusement device is selected, for example amusement device 302 in FIG. 3. Subsequently, a first subset of amusement devices is selected from the second set 240 of non-updated amusement devices. As one example, the first selected subset (307) may consist of amusement devices 208 and 210. The amusement devices in the subset may be chosen according to any criteria. For example, the subset may consist of amusement devices in the same telephone area code as the amusement device 302, or may consist of amusement devices physically nearby one another on a local network.

Once the first subset 307 is chosen, the selected updated amusement device 302 connects to each non-updated



5,930,765

7

amusement device 208 and 210 in the first subset 307 and downloads song updates or other information to the non-updated amusement devices 208 and 210. The selected amusement device 302 may use a MODEM, for example, to sequentially call each non-updated amusement device 208 and 210 in the first subset 307 and download data. Each non-updated amusement device 208 and 210 in the first subset 307 thereby becomes an updated amusement device and may be selected as an updated amusement device in a subsequent selecting and updating step. In FIG. 4, the amusement devices 208 and 210 are shown updated (and indicated by reference numeral 308 and 310) by the selected amusement device 202. In other words, and as previously stated, amusement devices 208 and 210 formed a first subset 307 of the second set 240 during an update step in which amusement device 302 operated as the selected update amusement device.

Typically, an updated amusement device is not considered in a subsequent subset selection step since the amusement device is already updated. In addition, the selection of an updated amusement device need not be a physical selection in response to, for example, operator input. Rather, the selection process may comprise a program running in the amusement devices 202-234 which periodically initiates a connection to another amusement device 202-234 or the central station 236. As will be explained in more detail below, the selection process may also be responsive to a download tree generated by an updated amusement device and forwarded to each amusement device as the amusement device is updated. Furthermore, internal timers, implemented as, for example, real time clocks, may control the periodic update of the amusement devices 202-234.

FIG. 4 also shows the result of the updated amusement device 304 having updated amusement device 212 (the only member chosen to form the second subset 402) and the result of the updated amusement device 306 having updated amusement device 214 (the only member chosen to form the third subset 404). The reference numerals 312 and 314 in FIG. 4 indicated updated versions of the amusement devices 212 and 214. The steps of selecting an updated amusement device, selecting a subset of the second set, connecting the selected updated amusement device to each electronic amusement device in the selected subset, and downloading information are iterated until a predetermined number of the amusement devices 202-234 are updated.

For example, in FIG. 4, the amusement devices 308-314, now updated, may proceed to update additional amusement devices. As an example, the updated amusement device 308 may then select a fourth subset 406 of non-update amusement devices consisting of amusement devices 216 and 218, the updated amusement device 310 may select a fifth subset 408 consisting of amusement devices 220, 222, and 224, while the updated amusement device 314 may select a sixth subset 410 consisting of amusement device 226. Each updated amusement device 308-314 downloads information to the non-updated amusement devices 216-226. FIG. 5 shows each amusement device 216-226 after updating, indicated by reference numerals 316-326.

Performing another iteration completes the updating procedure for all of the originally non-updated amusement devices 208-234 in the second set 240. Updated amusement device 318, for example, may select a seventh subset 412 consisting of amusement device 228, updated amusement device 320 may select an eighth subset 414 consisting of amusement devices 230 and 232, while the update amusement device 324 may select a ninth subset 416 consisting of amusement devices 234. FIG. 6 shows each amusement

8

device 228-234 after updating, indicated by reference numerals 328-334.

Performing downloading according to the above described method greatly reduces the bandwidth requirements of the central station 236 by distributing the updating functions to the amusement devices. It is noted that the connections shown in FIGS. 2-6 need not be static. In other words, it may be possible for a particular amusement device to use a MODEM, for example, to update any or none of the other amusement devices and to select a new subset of amusement devices each time the method is invoked. When it is desirable to reduce the costs associated with updating the amusement devices, a particular amusement device may, for example, be programmed or configured to only update amusement devices in its own telephone area code or telephone exchange. Furthermore, the mechanism used to download information may change each time information is downloaded. For example, updated amusement device 308 may use a MODEM to connect to amusement devices 216 and 218, while updated amusement device 318 may use an RF link to update amusement device 228.

In addition, an amusement device 202-234 may create an information download tree (implemented as any common data structure, for example, a linked list) which maps the manner in which a subsequent amusement device 202-234 should update other amusement devices 202-234. For example, amusement device 202 may create a download tree specifying that amusement device 208 will update amusement devices 216 and 218, and that amusement device 218 will update amusement device 228. The download tree may then be forwarded to amusement devices 202-234 during the downloading of any other information.

Thus, one or more amusement devices 202-234 may relieve the burden of determining which amusement devices 202-234 to update to from other amusement devices 202-234. An amusement device 202-234 at any level may create a download tree and forward the download tree to subsequent amusement devices 202-234. Furthermore, the download tree may include alternative update schemes to be employed if a particular link between amusement devices 202-234 is inoperable. For example, amusement device 208 may include further information in the download tree instructing amusement device 216 update amusement device 228 if the link between amusement device 218 and amusement device 228 is inoperable.

While particular elements, embodiments and applications of the present invention have been shown and described, it will be understood, of course, that the invention is not limited thereto since modifications may be made by those skilled in the art, particularly in light of the foregoing instruction. It is therefore contemplated by the appended claims to cover such modifications as incorporate those features which come within the spirit and scope of the invention.

What is claimed is:

1. An improved method of updating electronic data stored in a plurality of electronic amusement devices, each electronic amusement device including memory for storing digital data, a communications interface, and a processor connected to said communications interface and said memory, said method comprising the steps of:

- providing a central station for storing data;
- determining a first set of at least one non-updated electronic amusement device;
- connecting each non-updated electronic amusement device in said first set to said central station and

5,930,765

9

downloading information to said non-updated electronic amusement device, thereby providing at least one updated electronic amusement device;

d) determining a second set of at least one non-updated electronic amusement device;

e) iterating the following steps:

- 1) selecting an updated electronic amusement device provided by downloading said information to a non-updated electronic amusement device;
- 2) determining a subset of said second set of at least one non-updated electronic amusement devices, said subset thereby including at least one non-updated electronic amusement device;
- 3) connecting said selected updated electronic amusement device to each non-updated electronic amusement device in said subset and downloading said information to said non-updated electronic amusement device, thereby providing at least one additional updated electronic amusement device which may be selected in a subsequent selection step.

2. The method of claim 1, wherein said iterating step iterates at least twice to download information to a first subset of non-updated electronic amusement devices and to download information to a second subset of non-updated electronic amusement devices.

3. The method claim 1, wherein said iterating step iterates at least three times to download information to a first subset of non-updated electronic amusement devices, to download information to a second subset of non-updated electronic amusement devices, and to download information to a third subset of non-updated electronic amusement devices.

4. The method claim 1, wherein said iterating step iterates until each non-updated amusement device in said second set has information downloaded to it.

5. The method of claim 1, wherein said connecting and downloading step e3 comprises the step of establishing a connection over a telephone line for at least one iterating step.

6. The method of claim 1, wherein said connecting and downloading step c comprises the step of establishing a connection over a telephone line.

7. The method of claim 6, wherein said connecting and downloading step e3 comprises the step of establishing a connection over a telephone line for at least one iterating step.

8. The method of claim 4, wherein said connecting and downloading step e3 comprises the step of establishing a connection over a telephone line for at least one iterating step.

9. The method of claim 4, wherein said connecting and downloading step c comprises the step of establishing a connection over a telephone line.

10. The method of claim 9, wherein said connecting and downloading step e3 comprises the step of establishing a connection over a telephone line for at least one iterating step.

11. The method of claim 1, wherein said connecting and downloading step c comprises downloading information selected from the group consisting essentially of advertisements, music, and computer program updates.

12. The method of claim 11, wherein said connecting and downloading step e3 comprises downloading information selected from the group consisting essentially of advertisements, music, and computer program updates.

13. The method of claim 4, wherein said connecting and downloading step c comprises downloading information selected from the group consisting essentially of advertisements, music, and computer program updates.

10

14. The method of claim 13, wherein said connecting and downloading step e3 comprises downloading information selected from the group consisting essentially of advertisements, music, and computer program updates.

15. The method of claim 1, wherein said connecting and downloading step c is responsive to a control selected from the group consisting essentially of computer programs, external inputs, and timers.

16. The method of claim 15, wherein said connecting and downloading step e3 is responsive a control selected from the group consisting essentially of computer programs, external inputs, and timers.

17. The method of claim 4, wherein said connecting and downloading step c is responsive to a control selected from the group consisting essentially of computer programs, external inputs, and timers.

18. The method of claim 17, wherein said connecting and downloading step e3 is responsive a control selected from the group consisting essentially of computer programs, external inputs, and timers.

19. The method of claim 1, wherein said connecting and downloading step e3 further comprises the step of transmitting a download tree.

20. The method of claim 19, wherein said connecting and downloading of step e3 further comprises the step of transmitting at least one alternate update scheme.

21. An improved method of updating electronic data stored in a computer jukebox, each computer jukebox providing a memory for storing digital data representing a plurality of songs, a digital to analog converter, at least one speaker connected to said digital to analog converter, a communications interface, and a processor connected to said communications interface and said memory, said method comprising the steps of:

- a) determining a first set of at least one non-updated computer jukebox;
- b) connecting each non-updated computer jukebox in said first set to a central station and downloading information to said non-updated computer jukebox, thereby providing at least one updated computer jukebox;
- c) determining a second set of at least one non-updated computer jukebox;
- d) iterating the following steps:
  - 1) selecting an updated computer jukebox provided by downloading said information to a non-updated computer jukebox;
  - 2) determining a subset of said second set of at least one non-updated computer jukebox, said subset thereby including at least one non-updated computer jukebox;
  - 3) connecting said selected updated computer jukebox to each non-updated computer jukebox in said subset and downloading said information to said non-updated computer jukebox, thereby providing at least one additional updated computer jukebox which may be selected in a subsequent selection step.

22. The method of claim 21, wherein said iterating step iterates at least twice to download information to a first subset of non-updated computer jukeboxes and to download information to a second subset of non-updated computer jukeboxes.

23. The method claim 21, wherein said iterating step iterates at least three times to download information to a first subset of non-updated computer jukeboxes, to download information to a second subset of non-updated computer jukeboxes, and to download information to a third subset of non-updated computer jukeboxes.

5,930,765

**11**

24. The method claim 21, wherein said iterating step iterates until each non-updated device in said second set has information downloaded to it.

25. The method of claim 21, wherein said connecting and downloading step b downloads information selected from the group consisting essentially of advertisements, music, and computer program updates.

26. An improved method of updating electronic data stored in an electronic dart game, each electronic dart game providing a memory for storing digital data, a dart target, a communications interface, and a processor connected to said communications interface and said memory, said method comprising the steps of:

- a) determining a first set of at least one non-updated electronic dart game;
- b) connecting each non-updated electronic dart game in said first set to a central station and downloading information to said non-updated electronic dart game, thereby providing at least one updated electronic dart game;
- c) determining a second set of at least one non-updated electronic dart game;
- d) iterating the following steps:
  - 1) selecting an updated electronic dart game provided by downloading said information to a non-updated electronic dart game;
  - 2) determining a subset of said second set of at least one non-updated electronic dart game, said subset thereby including at least one non-updated electronic dart game;

**12**

3) connecting said selected updated electronic dart game to each non-updated electronic dart game in said subset and downloading said information to said non-updated electronic dart game, thereby providing at least one additional updated electronic dart game which may be selected in a subsequent selection step.

27. The method of claim 26, wherein said iterating step iterates at least twice to download information to a first subset of non-updated electronic dart games and to download information to a second subset of non-updated electronic dart games.

28. The method claim 26, wherein said iterating step iterates at least three times to download information to a first subset of non-updated electronic dart games, to download information to a second subset of non-updated electronic dart games, and to download information to a third subset of non-updated electronic dart games.

29. The method claim 26, wherein said iterating step iterates until each non-updated device in said second set has information downloaded to it.

30. The method of claim 26, wherein said connecting and downloading step b downloads information selected from the group consisting essentially of advertisements, music, and computer program updates.

\* \* \* \* \*



# **Exhibit E**



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(12) **United States Patent**  
**Ballhorn**

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(54) **MULTIMEDIA BOX NETWORK**

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**725/110; 709/217; 434/307 A**

(58) Field of Search ..... **725/98, 114-119,**  
**725/110, 109, 111, 113, 122, 9-93; 709/217-219,**  
**223-232; 434/307 A; 455/414, 420, 557,**  
**3.01, 3.03, 3.06**

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(57) **ABSTRACT**

The invention relates to a multimedia box network consisting of a data server comprising a mass storage device, on which digital pieces of music and/or videos are stored, and of a plurality of multimedia boxes, with one multimedia box in each case comprising an operating unit, a local storage device and a player unit, and with each multimedia box being connected to the data server by means of a first data link. To provide a high-performance network for multimedia boxes, which allows a decentralised servicing of the multimedia boxes, it is provided that at least one management station comprising a computer is connected to the data server by means of a second data link and to at least one multimedia box by means of a third data link.

**18 Claims, 3 Drawing Sheets**

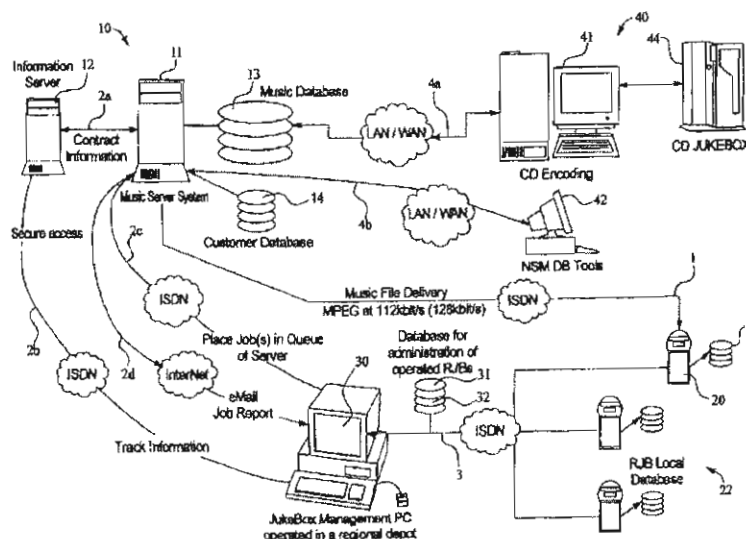
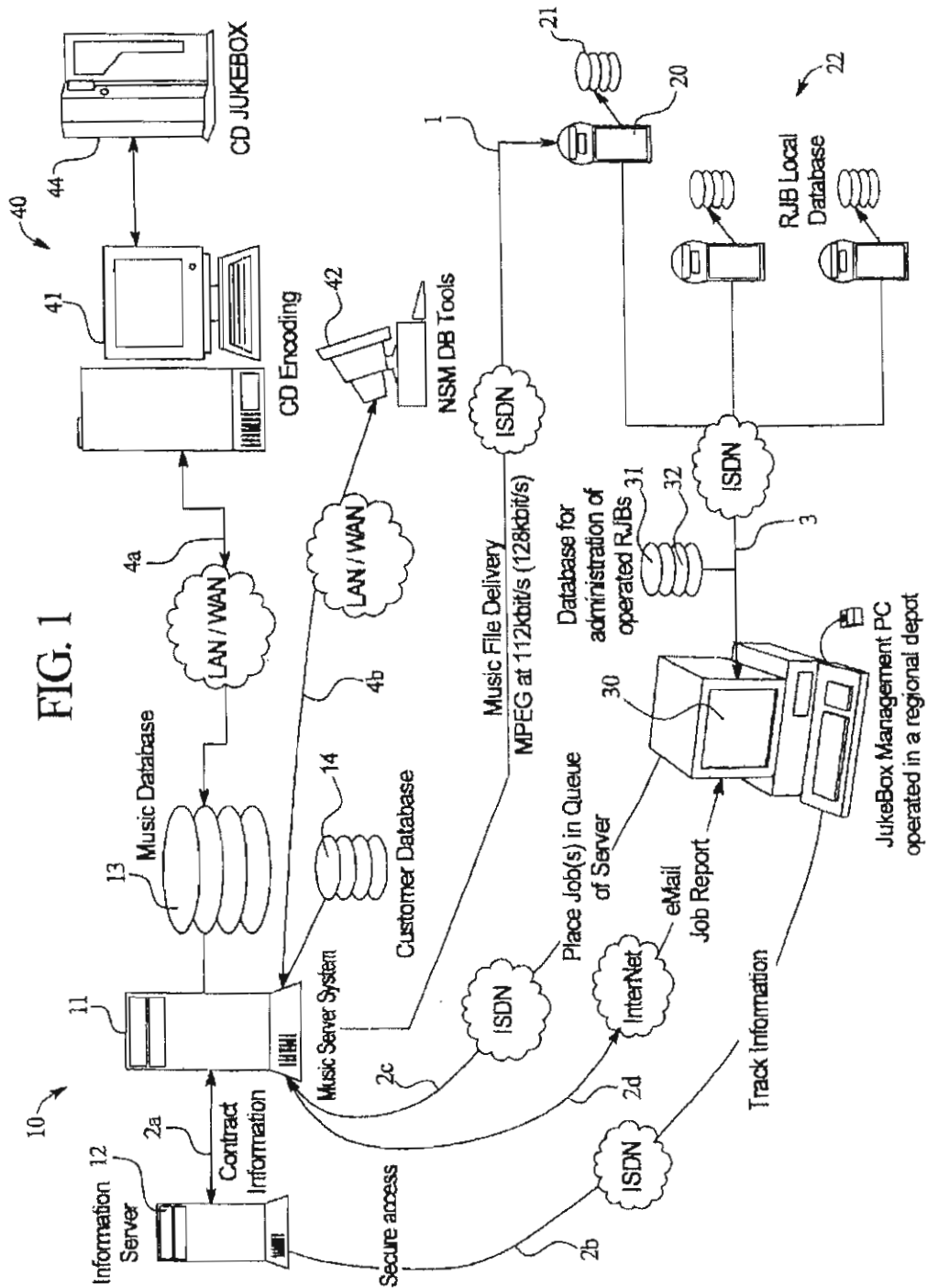


FIG. 1

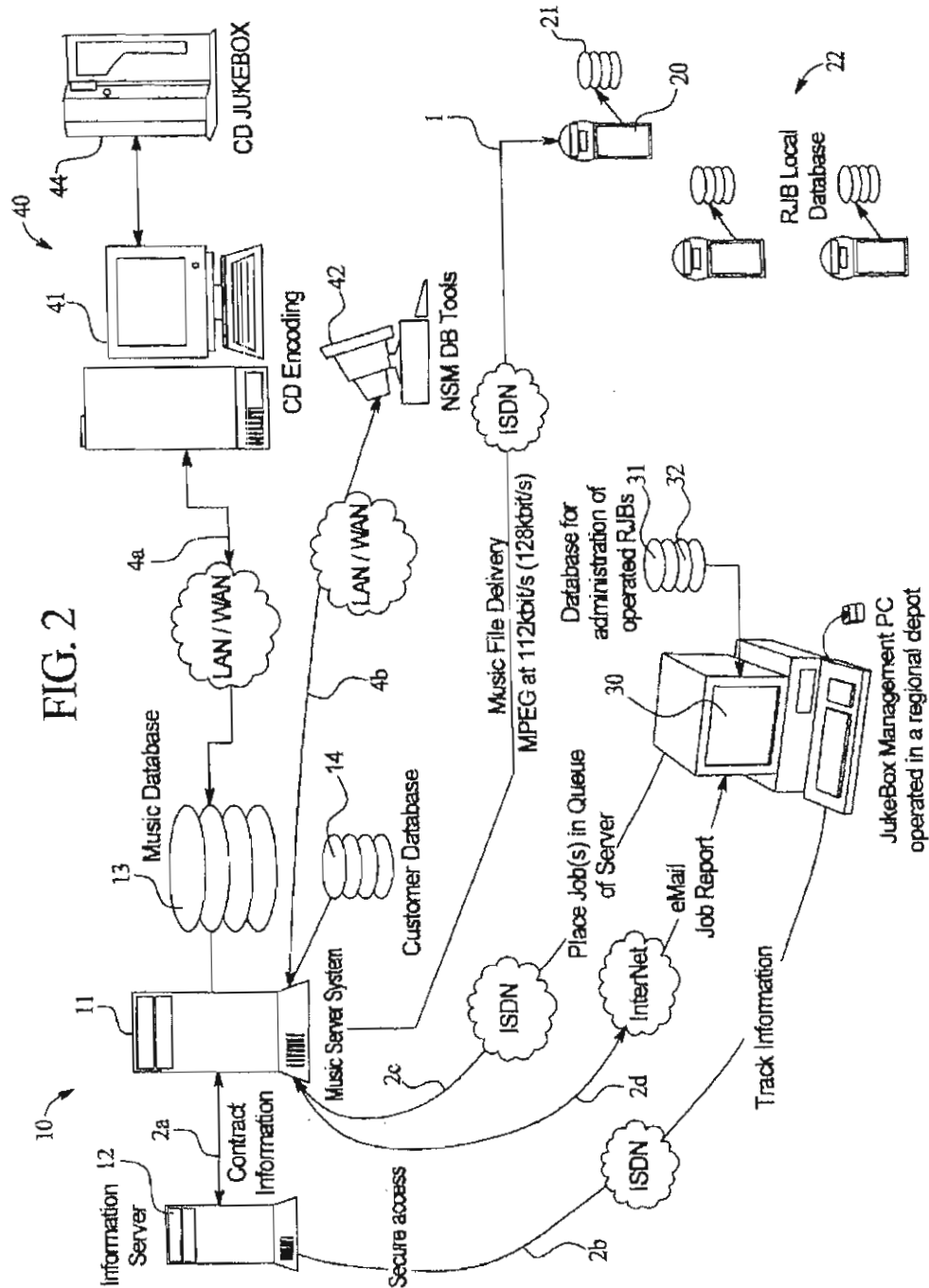


U.S. Patent

Jul. 22, 2003

Sheet 2 of 3

US 6,598,230 B1



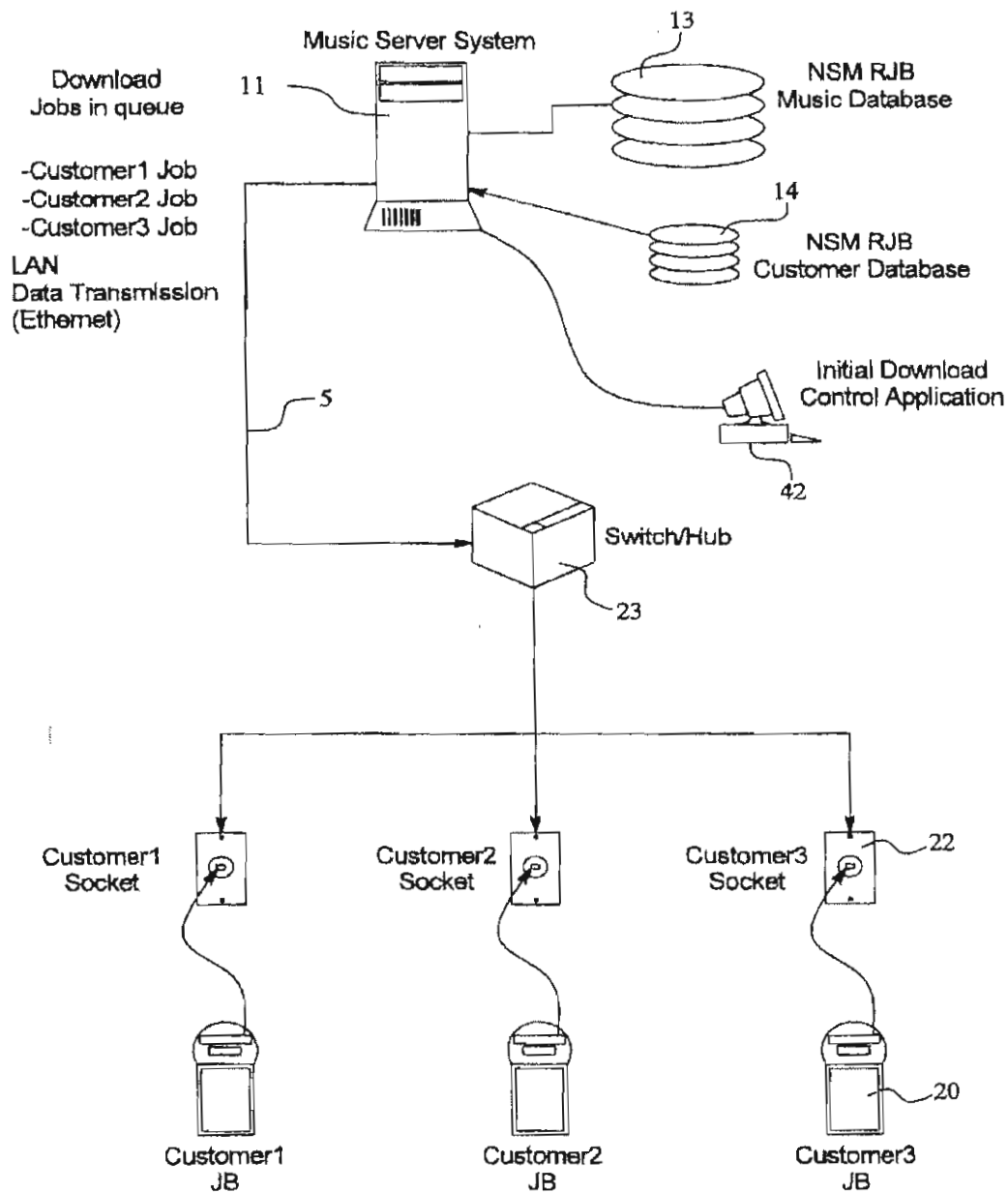
U.S. Patent

Jul. 22, 2003

Sheet 3 of 3

US 6,598,230 B1

FIG. 3





US 6,598,230 B1

1

**MULTIMEDIA BOX NETWORK****BACKGROUND OF THE INVENTION****1. Field of the Invention**

The invention relates to a multimedia box network consisting of a data server comprising a mass storage means on which digital pieces of music and/or videos are stored and of a plurality of multimedia boxes, with each multimedia box comprising an operating apparatus, a local storage means and a player apparatus and with each multimedia box being connected to the data server by means of a first data link.

**2. Description of the Related Art**

Such a network is known, for example, from WO 92/01342. In accordance with WO 92/01342, a plurality of automatic jukeboxes are each linked to a central music storage means by means of a remote data transmission line, with said remote data transmission line preferably being an ISDN line. The automatic jukebox possesses in a known manner a coin acceptance device, a display, an input keypad and at least one loudspeaker and further possesses a digital to analog converter and amplifier for sound data recorded via the remote data transmission line.

From DE 42 44 198 A1, a network for a plurality of jukeboxes is known, said network having a decentralised structure. Here, no central storage device is provided for the pieces of music which can be played, but rather the pieces of music to be stored are distributed over a certain number of music player apparatuses. The music player apparatuses are linked to one another in a network so that a piece of music can be requested from each music player unit to any other music player unit. A central computer additionally performs central management jobs, with, in particular, utilisation data of the individual music player apparatuses being stored on the central computer.

From U.S. Pat. No. 5,355,302, a network is known consisting of multiple jukeboxes, in which the individual jukeboxes are linked to a central management station in a star-shaped structure. The management station comprises a host computer and a mass storage device so that music data can be transmitted to the individual jukeboxes by the management station. In addition, the management station also takes over management jobs. For the servicing of the individual jukeboxes, a portable console is provided in each case which can be hooked up to the corresponding jukebox on site.

One disadvantage of the networks for jukeboxes described above is that either only central servicing by means of a central computer or, however, servicing on site for an individual jukebox is possible.

**SUMMARY OF THE INVENTION.**

It is therefore the object of this invention to provide a high-performance network for multimedia boxes which allows a decentralised servicing of a plurality of multimedia boxes.

This object is obtained with the present invention which includes at least one management station comprising a computer being linked by means of a second data link to the data server and by means of a third data link to at least one multimedia box, with pieces of music and/or videos being able to be transmitted from the data server to the multimedia box via the first data link, with data on the pieces of music and/or videos available on the data server being able to be transmitted via the second data link and with data for the

2

servicing and/or programming of the individual jukeboxes being able to be transmitted from the management station connected thereto via the third data link. In accordance with the invention, a management station is therefore provided in each case for a certain group of a plurality of multimedia boxes, such management station allowing a decentralised servicing of said multimedia boxes. The management station does not here take over the job of transmitting large volumes of data, but merely regulates the exchange of information between the data server and the individual multimedia boxes while taking into account the range of pieces of music and/or videos provided in each case for a multimedia box.

With the multimedia box network in accordance with the invention, it is thus possible to service and manage a plurality of multimedia boxes in a decentralised manner by one operator or one operating company. The operating company can, in turn, forward the programme range for a multimedia box or the service for the maintenance of the multimedia box to the end user in each case. In this way, a decentralised system is provided for the operation of a plurality of multimedia boxes which are, in turn, linked to a data server in a cost-favourable manner.

In accordance with a preferred embodiment, the first data link between the data server and a multimedia box consists of an ISDN line.

In accordance with a preferred embodiment, it is provided that a service database of the pieces of music and/or videos available on the data server is stored on the management station, with said service database being able to be updated via the second data link. Even in the case of a large volume of data of stored pieces of music and/or videos on the data server, the compilation of the titles available in each case represents only a relatively low volume of data so that these can be stored without problem on the corresponding management stations in a database, too. As soon as certain services should be performed with a management station, first a connection is made to the central data server to update the service database of the corresponding management station. For this purpose, the data server transmits an add command to the management station for each new title to be added and a delete command for titles to be deleted.

To simplify the management of the pieces of music and/or videos available in each case on the data server, it can be provided that the data server consists of a main server and an information server. While the actual data of the pieces of music and/or videos are stored on the main server, the information server only manages the titles stored on the main server, in which way the main server is relieved. Appropriately, in this process all the data on the data programme of the main server is stored in an information database on the information server, with the exchange of data between the main server and the information server being made via a parallel data link. However, it is naturally also possible for the information server to be separated in space from the main server and for it to communicate with the main server via a suitable serial data link.

In accordance with another preferred embodiment, it is provided that a user database of the user data is stored on the management station, by means of which via the third data link a servicing and/or programming of the multimedia box connected in each case is possible. In this way, on the management station, the information on the multimedia box connected in each case is available directly without any additional data transmission being required for this purpose. In particular, the status of the multimedia boxes connected to the management station in each case can be stored on the

US 6,598,230 B1

3

user database. With the management station, it is thus possible to modify on the multimedia box in each case certain graphics and presentation forms of the titles stored equally as, for example, billing procedures towards the operator of the management station in each case.

In accordance with another preferred embodiment, it is provided that a command to record pieces of music and/or videos onto a certain multimedia box can be sent by the management station connected thereto to the data server via the second data link and/or via an additional link, with the recording of pieces of music and/or videos on the certain multimedia box being performed via the first data link. As a result, on the basis of the information database, the titles to be newly recorded for a multimedia box are compiled on the management station and a corresponding command generated from this for the data server. This command is then sent to the data server. To the extent that on the part of the data server there is a separation between an information server and a main server, the sending of the command is preferably made directly via an additional data link to the main server. The additional data link here preferably consists of an ISDN line in the direction of the data server and of an Internet connection in the opposite direction to the management station. Via the ISDN line, the command can be sent fast and directly to the data server or the main server, while, as a rule, it is not necessary to wait for confirmation from the data server or the main server that the command has actually been performed. For this reason, it is meaningful to send the command confirmation of the data server or the main server via the Internet where the corresponding message can be stored as an e-mail and downloaded from the management station at a suitable opportunity.

With regard to the design of the third data link between the management station and a multimedia box, two possibilities exist: on the one hand, a direct data link consisting of an ISDN line can be set up between the management station and the multimedia box in each case. On the other hand, however, it is also feasible that the already existing data links in accordance with the first data link and the second data link can be utilised, by these being connected in series in a suitable manner. For example, it is feasible to use the additional data link to the main server described above to connect this to the ISDN line between the main server and a multimedia box. For this purpose, the main server receives a corresponding connection call from the management station and switches this through to the corresponding ISDN line. In a corresponding way, it is naturally also possible to utilise the ISDN line described above between the management station and the information server. A switching on to the first data link consisting of an ISDN line between the main server and a multimedia box is then performed via the parallel data link between the information server and the main server.

The recording of corresponding music data on the data server is performed preferably by means of a CD playing apparatus. However, it should be noted here that the data format of the music data stored on a CD is not suitable for transmission in large volumes of data. It is therefore appropriate to convert the music data stored on a CD into a suitable format for transmission, with, for example, the MPEG format being suitable for pieces of music or music data and the JPEG format for images. As part of the transmission of images, in particular cover images can also be transmitted, with, when a piece of music is being played by the multimedia box, an associated cover image being displayed.

In accordance with a preferred embodiment, it is provided that the operating unit of a multimedia box consists of a

4

touch-screen monitor on which the digital pieces of music and/or videos stored in the local memory can be displayed and selected by finger pressure and forwarded to a player apparatus. The player apparatus here consists in a normal manner of an amplifier/loudspeaker apparatus for the playing of the pieces of music and, where required, of a video monitor to display cover images or to present video images.

#### BRIEF DESCRIPTION OF THE DRAWINGS.

Further details and advantages of the invention are explained in more detail by means of an embodiment shown in the drawing, in which:

FIG. 1 shows the multimedia box network in accordance with the invention in operation in a first embodiment;

FIG. 2 shows the multimedia box network in accordance with the invention in operation in a second embodiment;

FIG. 3 shows the initialisation of individual multimedia boxes prior to their being put into operation.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

FIG. 1 shows the multimedia box network in accordance with the invention in a first embodiment.

The essential components of the multimedia box network are the data server 10, the multimedia boxes 20 connected thereto in a star-shaped structure, the management station 30 and a CD player unit 40. In the following, the network is described only for the transmission of music data, but the same also applies correspondingly to the transmission of other data in the multimedia area such as image data or video data. The data server 10 is, in turn, divided into a main server 11 and an information server 12, which communicate with each other via a data link 2a. On the main server 11, all music data and/or image data are stored in a database 13, while data concerning billing and licensing are stored in a user database 14. On the information server 12, in contrast, all access data of the pieces of music available on the main server are stored. To record digital music data on the database 13, a CD encoding system 41 with a CD changer 44 is provided. The CD encoding system converts the CD data format into a suitable transmission format, for example an MPEG format, so that the converted data can be transmitted to the music database 13 via a LAN/WAN data line 4a. To manage the user database 11, in the CD player unit an additional operating unit 42 is provided which is connected to the main server 11 via the LAN/WAN data line 4b.

As a rule, only a data server 10 consisting of a main server and an information server 12 is required, with, for example, up to 10,000 pieces of music being able to be stored in MPEG format in the music database 13. Then, the individual jukeboxes are connected in a star-shaped structure to the main server 10 via an ISDN line, with, for reasons of simplification, in FIG. 1 only one ISDN line 1 to one jukebox 20 being shown. A certain number of jukeboxes is operated and serviced by one operating company in each case so that these jukeboxes represent one operator group



US 6,598,230 B1

5

22. Each operator group 22 has a management station 30 allocated to it, which is linked in each case via an ISDN line 3 in a star-shaped structure to the individual jukeboxes 20 of one operator group 22. The management station 30 comprises a user database 31, on which the status of the connected jukeboxes 20 is managed. On the side of the management station 30, it is possible to modify on the jukebox 20 presentation types equally as certain billing procedures.

In addition to the user database 31, the management station also comprises a service database 32 on which the pieces of music available on the data server are managed. To update the service database 32, the management station 30 is linked to the information server 12 with an ISDN line 2b. In addition, there is in the direction of the main server 11 an ISDN link 2c and, in the opposite direction from the main server 11 to the management station 30 an Internet connection 2d.

In the operation of the network in accordance with FIG. 1, a difference must essentially be made between the recording of new music data on the main server 11, the recording of new music data on the jukeboxes 20 and the playing of pieces of music by the corresponding jukebox 20.

The recording of new music data on the music server is performed via the CD player apparatus 40 via the LAN/WAN line 4a to the music database 13. The music data are transmitted in the MPEG 1 layer 3 format so that per minute of playing time around 1 megabyte of memory is required. For the individual pieces of music, the licensing over the operating company of an operating group 22 is monitored in each case in the user database 14. A piece of music can, for example, be licensed for one year so that after the year new license fees are incurred if the piece of music is still requested from the operating company.

The recording of new pieces of music to one music box 20 in each case is performed at the instigation of the operating company in the management station 30 in each case. The logging in on the part of the management station 30 on the data server 10 is performed in a first step via the ISDN line 2b over the information server 12. After the log-in, the information server 12 transmits two command groups to update the service database 32, namely an "add command" and a "delete command". The add command comprises a list of all music titles which were recorded by the CD player unit 40 after the last log-in. In contrast, the delete command contains a list of the music titles deleted from the music database 13 since the last log-in. After the log-in, the service database 32 thus represents a mirror image of the data on the music database 13 on the information server 12.

After the up-dating of the service database 32 has been concluded, new music titles can be selected from the data programme by the operator which are to be newly recorded on a certain jukebox 20 of the operator group 22. After the selection of the titles, a corresponding command is sent to the main server 11 via the ISDN line 2c. No further steps are required on the management station 30 so that the management station 30 can generally be switched out of the network after the sending of the command in question. The command received by the corresponding management station 30 is queued into a list of commands to be processed by the main server and processed at the appropriate time. For this purpose, the main server 11 makes a data link to the corresponding jukebox 20 via the ISDN line 1 and plays the selected music titles from the music database 13 into the local database 21 of the jukebox 20. Once all music titles

6

have been played over completely, the successful processing of the command is confirmed to the corresponding management station 30 via the Internet link 2d. The confirmation message is sent as an e-mail here and can be downloaded from the management station 30 at a convenient time.

FIG. 2 shows the multimedia box network in accordance with the invention in operation in a second embodiment.

The multimedia network of FIG. 2 differs from the network of FIG. 1 in that the third data link between the jukebox (20) in each case and the management station (30) does not consist of a direct ISDN link (3), but of an ISDN link led through the data server. Here, the already existing data links 2b or 2c and 2a and 1 are connected in series in such a way that a data link can be made between the jukebox in question and the management station.

FIG. 3 shows the initialisation of individual jukeboxes prior to their being put into operation.

A jukebox 20 is as a rule supplied with an empty local database 21 so that prior to its being put into operation the corresponding jukebox has to be initialised.

On the one hand, the initialisation of a jukebox can be performed after its installation on site so that then in accordance with FIG. 1 corresponding music data can be played over with an initialisation program available on the main server 11 via the ISDN line 1. One disadvantage of this initialisation consists, however, of relatively high transmission costs being incurred through the ISDN line, as on the first recording of the local database 21 large volumes of data have to be transmitted.

Another possibility of initialisation therefore consists of the configuration of FIG. 2 where the jukeboxes 20 to be initialised are located in proximity to the main server 11 so that the corresponding data can be played over via a local network link 5. In this way, data links with a transmission rate of some megabits per second can be made, while via the conventional ISDN line between the main server 11 and a jukebox 20 of FIG. 1, transmission rates of only 128 Kbit per second can be achieved. After the jukeboxes 20 have been initialised accordingly, they can be supplied to the relevant operator, with the operator only having to connect the jukebox to a conventional ISDN phone socket at the installation location.

The invention being thus described, it will be apparent that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be recognized by one skilled in the art are intended to be included within the scope of the following claims.

What is claimed is:

1. A multimedia box network comprising:

- a main data server including a mass storage device on which digital pieces of music and/or videos are stored;
- an operator group including at least one multimedia box linked to said main data server by a first data link over which pieces of music and/or videos are transmitted, said at least one multimedia box including an operating unit, a local storage device and a player apparatus;
- a peripheral management station connected to said main data server by a second data link over which said peripheral management station can receive data on the pieces of music and/or videos available on said main data server, said peripheral management station including a computer connected to said operator group by a third data link over which data for servicing and/or programming of said at least one multimedia box can be transferred from said peripheral management station.

US 6,598,230 B1

7

2. The multimedia box network as set forth in claim 1, wherein said peripheral management station is remotely located from said operator group, and said third data link includes a direct ISDN line.

3. The multimedia box network as set forth in claim 1, wherein said third data link is connected in series with said first data link and said second data link.

4. The multimedia box network as set forth in claim 1, wherein said first data link includes an ISDN line.

5. The multimedia box network as set forth in claim 1, wherein said peripheral management station includes a service database for storing information on the pieces of music and/or videos available on said main data server, which stored information can be updated over said second data link.

6. The multimedia box network as set forth in claim 5, wherein said stored information is updated over said second data link using an add command and a delete command.

7. The multimedia box network as set forth in claim 1, wherein said main data server includes a separate information server storing information on a data program contained within said main data server, data between said main data server and said information server being exchanged via a parallel data link.

8. The multimedia box network as set forth in claim 1, wherein said operator group includes a plurality of multimedia boxes, said peripheral management station transferring data for servicing and/or programming of each of said plurality of multimedia boxes over said third data link.

9. The multimedia box network as set forth in claim 2, wherein said operator group includes a plurality of multimedia boxes, said peripheral management station transferring data for servicing and/or programming of each of said plurality of multimedia boxes over said third data link.

10. The multimedia box network as set forth in claim 5, wherein said peripheral data station provides said operator group with said data on the pieces of music and/or videos available on the main data server over said third data link, but said pieces of music and/or videos themselves are delivered to said operator group from said main data server over said first data link.

11. The multimedia box network as set forth in claim 1, further comprising a plurality of operator groups each including at least one multimedia box, each of said plurality of operator groups connected to a respective one of a plurality of peripheral management stations for decentralized servicing of said multimedia boxes through said respective peripheral management stations.

12. The multimedia box network as set forth in claim 1, wherein a command from said peripheral management station to play over specified pieces of music and/or videos onto said multimedia box connected thereto is sent to said main data server via said second data link, with actual

8

playing over of said specified pieces of music and/or videos to said multimedia box being done via said first data link.

13. The multimedia box network as set forth in claim 12, wherein said second data link includes an ISDN line in a direction toward said main data server and an Internet connection in a direction toward said peripheral management station.

14. The multimedia box network as set forth in claim 9, wherein said peripheral management station includes a user database storing a status of each of said plurality of multimedia boxes connected to said peripheral management station.

15. The multimedia box network as set forth in claim 1, wherein said operating unit includes a touch-screen monitor for displaying identifying information on digital pieces of music and/or video stored in said local storage device, said touch-screen monitor allowing selection of a piece of music and/or video for forwarding to said player apparatus.

16. A multimedia box network comprising:

a main data server including a mass storage device on which digital pieces of music and/or videos are stored; an operator group including at least one multimedia box remotely linked to said main data server by a first data link over which pieces of music and/or videos are transmitted, said at least one multimedia box including an operating unit, a local storage device and a player apparatus;

a peripheral management station connected to said main data server by a second data link, separate from said first data link, over which said peripheral management station can receive data on the pieces of music and/or videos available on said main data server, said peripheral management station remotely located from said main data server and from said operator group and including a computer connected to said operator group by a third data link, separate from said first and second data links, over which data for servicing and/or programming of said at least one multimedia box can be transferred from said remotely located peripheral management station.

17. The multimedia box network as set forth in claim 16, further comprising a plurality of operator groups each including at least one multimedia box, each of said plurality of operator groups connected to a respective one of a plurality of peripheral management stations for decentralized servicing of said multimedia boxes through said respective peripheral management stations.

18. The multimedia box network as set forth in claim 16, wherein said operator group includes a plurality of multimedia boxes serviced by said peripheral management station, said peripheral management station being operated in a regional depot.

\* \* \* \* \*

# **Exhibit F**





US006970834B2

(12) **United States Patent**  
**Martin et al.**

(10) Patent No.: **US 6,970,834 B2**

(45) Date of Patent: **\*Nov. 29, 2005**

(54) **ADVERTISEMENT DOWNLOADING  
COMPUTER JUKEBOX**

(58) Field of Search ..... 705/14; 369/30.06,  
369/30.07; 84/601; 360/28, 39, 55; 700/234,  
700/241

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**Michael L. Tillery**, Rockford, IL (US);  
**Samuel N. Zammuto**, Rockford, IL  
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(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 102 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **10/300,147**

(22) Filed: **Nov. 20, 2002**

(65) **Prior Publication Data**

US 2003/0074219 A1 Apr. 17, 2003

**Related U.S. Application Data**

(60) Continuation of application No. 09/309,400, filed on May 11, 1999, now abandoned, which is a continuation of application No. 08/975,612, filed on Nov. 12, 1997, now Pat. No. 5,930,765, which is a continuation-in-part of application No. 08/638,022, filed on Apr. 25, 1996, now Pat. No. 5,848,398, which is a continuation-in-part of application No. 08/584,253, filed on Jan. 11, 1996, now Pat. No. 5,781,889, which is a continuation of application No. 08/268,782, filed on Jun. 30, 1994, now abandoned, which is a division of application No. 07/846,707, filed on Mar. 6, 1992, now Pat. No. 5,355,302, which is a continuation-in-part of application No. 07/538,981, filed on Jun. 15, 1990, now abandoned.

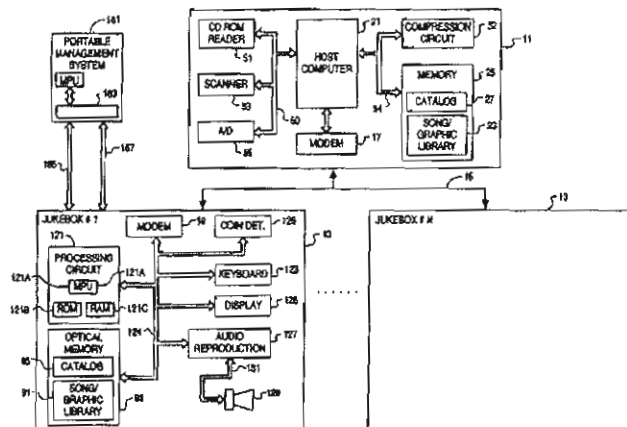
(57) **ABSTRACT**

A computer jukebox capable of receiving and storing advertisement data representing a plurality of advertisement from a remote central management system by way of a transmission link between the computer jukebox and the central management system, comprising a communication interface, a programmable computer memory and a processor. The computer jukebox downloads advertisement data. The communication interface receives advertisement data from the remote central management system by way of the transmission link. The advertisement data represents an identity of each of the plurality of advertisements, and data representing times for each of the advertisements to be run. The programmable computer memory stores the advertisement data. The processor runs the plurality of advertisements according to the advertisement data.

(51) Int. Cl.<sup>7</sup> ..... **G06F 17/00**

(52) U.S. Cl. .... **705/14; 369/30.06**

**17 Claims, 5 Drawing Sheets**



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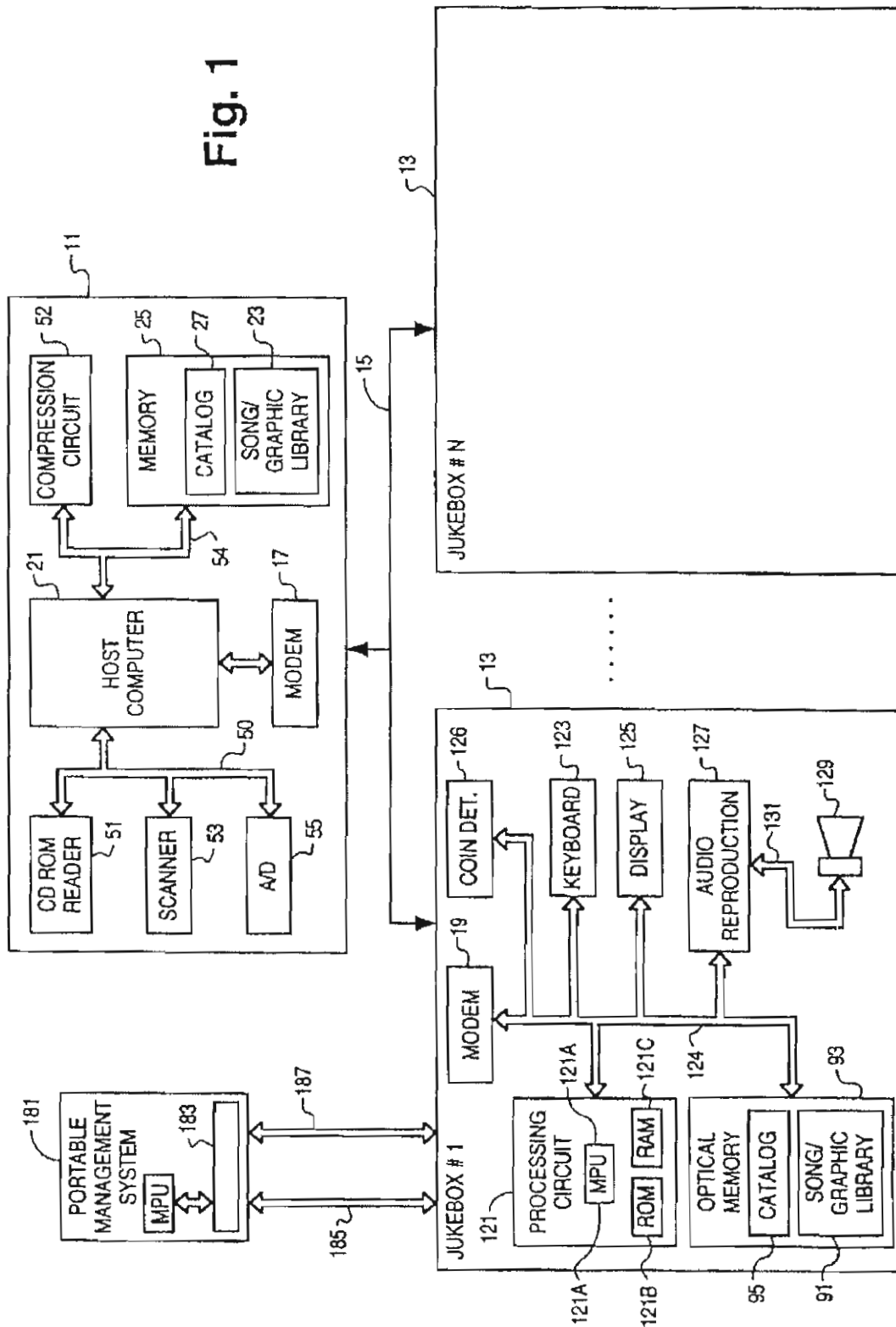
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Sheet 1 of 5

US 6,970,834 B2



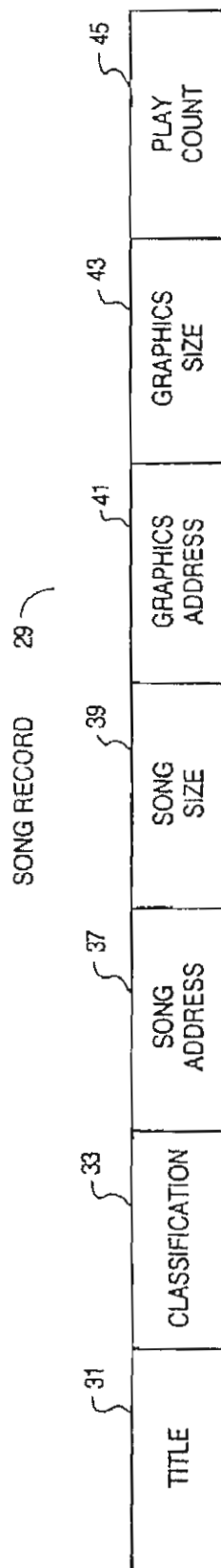
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Sheet 2 of 5

US 6,970,834 B2

Fig. 2



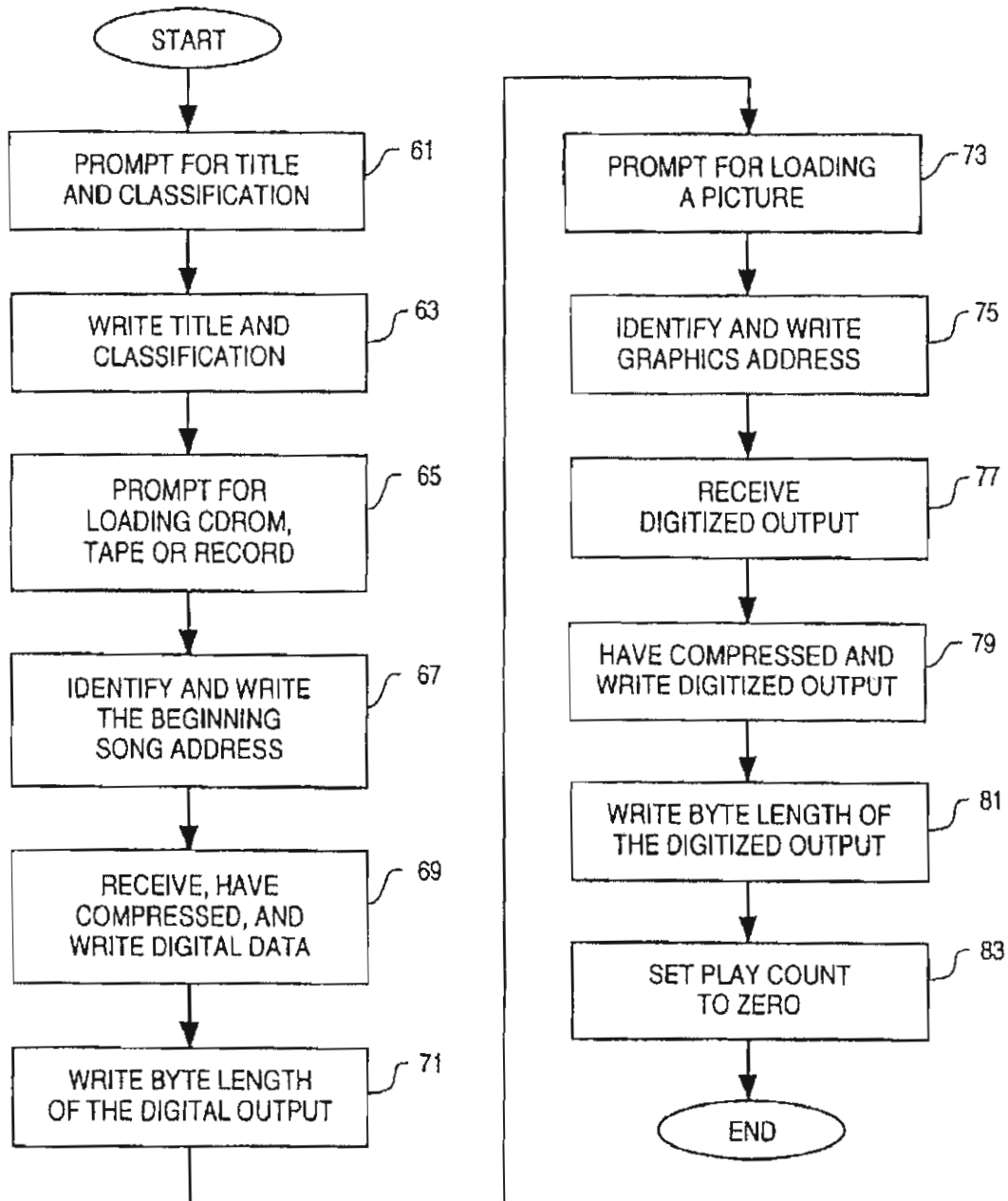
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\*Nov. 29, 2005

Sheet 3 of 5

US 6,970,834 B2

Fig. 3





U.S. Patent

\*Nov. 29, 2005

Sheet 4 of 5

US 6,970,834 B2

Fig. 4A

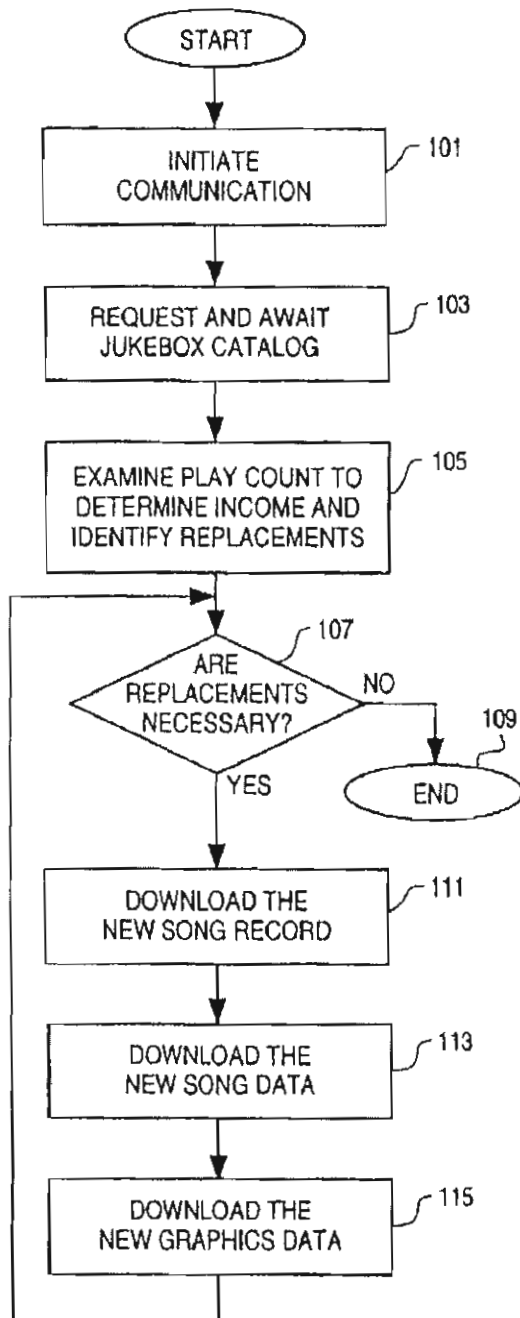
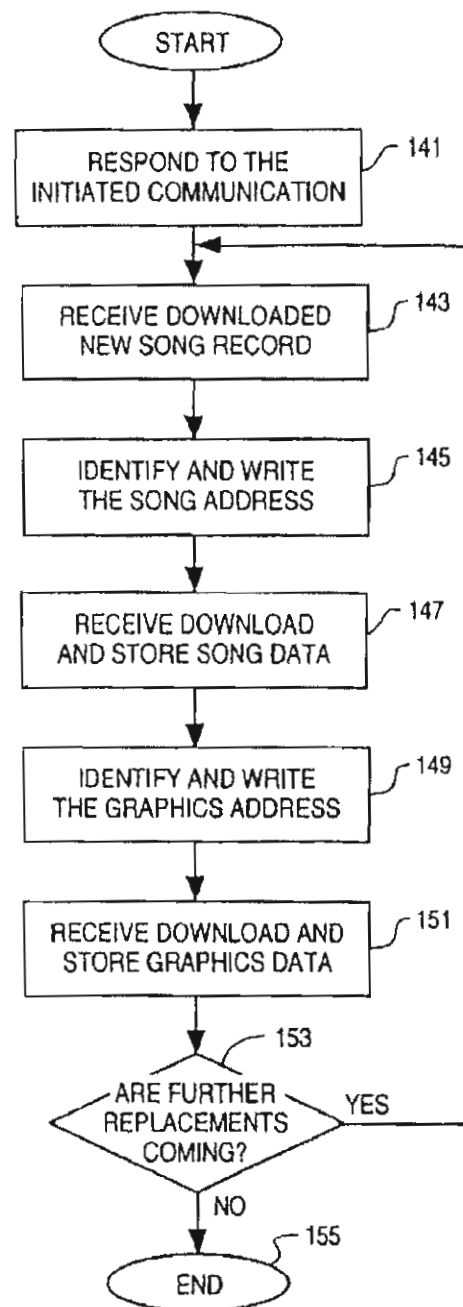


Fig. 4B



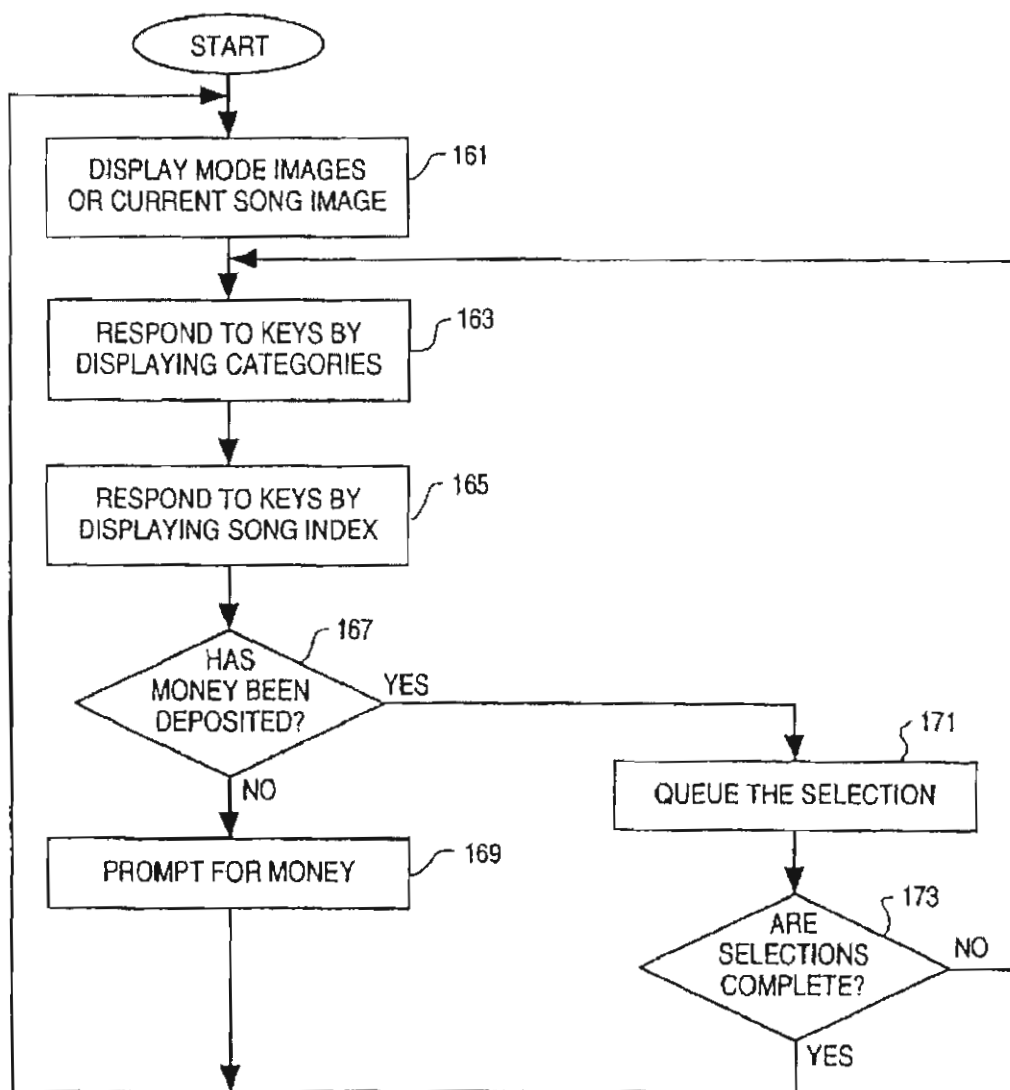
U.S. Patent

\*Nov. 29, 2005

Sheet 5 of 5

US 6,970,834 B2

Fig. 5



US 6,970,834 B2

1

ADVERTISEMENT DOWNLOADING  
COMPUTER JUKEBOX

## RELATED APPLICATIONS

This application is a continuation of Ser. No. 09/309,400, filed May 11, 1999, now abandoned which is a continuation of Ser. No. 08/975,612, filed Nov. 21, 1997 now U.S. Pat. No. 5,930,765, which is a continuation-in-part of Ser. No. 08/638,022, filed Apr. 25, 1996, now U.S. Pat. No. 5,848,398, which is a continuation-in-part of Ser. No. 08/584,253, filed Jan. 11, 1996, now U.S. Pat. No. 5,781,889, which is a continuation of Ser. No. 08/268,782, filed Jun. 30, 1994, now abandoned, which is a divisional of Ser. No. 07/846,707, filed Mar. 6, 1992, now U.S. Pat. No. 5,355,302, which is a continuation in part of Ser. No. 07/538,981, filed Jun. 15, 1990, now abandoned.

## BACKGROUND OF THE INVENTION

The present invention relates generally to a jukebox system, and more particularly to such a system including one or more computer jukeboxes that can be managed from a remote location.

Heretofore, an assortment of musical recordings found in a jukebox consists of a plurality of records, each record containing a specific recording. Traditionally, these records are grooved phonograph records. After a patron makes a selection, the selected phonograph record is mechanically removed from a storage rack within the jukebox, and the phonograph record is placed upon rotating platform. A stylus which is connected to a speaker system is then placed upon the rotating phonograph record, resulting in the phonograph record being played by the jukebox. For each selection, a separate phonograph record must be removed from the storage rack in order to be played by the jukebox.

Conventional jukeboxes have also implemented compact disks as means for creating an assortment of musical songs. Compact disks provide the improved sound quality made possible by digital recordings. The same technique, however, is used to play compact disks. A separate compact disk corresponding to each selection must be removed from a storage rack in order for the jukebox to play the selection. Updating conventional jukeboxes is a costly and time consuming task. Routemen must periodically travel to each jukebox location and replace the existing recordings of each jukebox with up-to-date records. The existing recordings are no longer used by the jukebox once removed, thus making the conventional method wasteful.

Routemen must also travel to each jukebox location to keep a tally of the number of times each musical recording is selected in order to determine royalty fees. It is known to provide a jukebox with a counter that keeps track of the number of times each musical recording is selected, but routemen must still travel to each jukebox location to obtain this information. Such a process requires an excessive number of people to visit each jukebox location periodically and visually read the information off the counter within each jukebox. Since the number of jukeboxes in operation is quite large, the employment of routemen to obtain such data involves a considerable expense. Furthermore, the ever changing nature of the recording industry requires that such data be gathered frequently in order to keep abreast of a continually changing market.

Conventional jukeboxes display a selection menu allowing a patron to select a particular recording that he or she may want to hear. When that song is being played, a video

2

accompanying the song is typically displayed on the screen. However, when the jukebox is not being used either the selection menu is still continually displayed or the screen is blank.

## BRIEF SUMMARY OF THE INVENTION

Accordingly, it is a primary object of the present invention to provide a method and apparatus for managing a plurality of computer jukeboxes which is capable of eliminating the necessity for routemen to change records in the jukeboxes. The computer jukeboxes store recordings in memory, thus enabling routemen to simply load new recordings into the memory of each computer jukebox.

Another object of the present invention is to eliminate a necessity for routemen by enabling new recordings and selection menus to be downloaded to each computer jukebox via a transmission link. In that regard, it is an object of the present invention to provide a method and apparatus which eliminates the material waste usually associated with updating jukeboxes. Instead of throwing away old recordings and replacing them with new ones, as is the conventional procedure, the present invention eliminates this waste by enabling new recordings to simply be downloaded into the memory of each computer jukebox. The old recordings are simply erased, if necessary.

Another object of the present invention is to provide a method and apparatus which is capable of remotely obtaining jukebox usage data, thus eliminating a necessity for routemen to do this task. The present invention utilizes a computer jukebox, which as part of its software programming, stores the number of times each musical recording is played and the number of credits that have been awarded. This data is uploaded to a central control device via a transmission link.

An additional object of the present invention is to provide a method and apparatus utilizing modern computer technology to digitally store and play musical records. The jukebox of the present invention is basically a computer having a sophisticated audio production capability, the computer storing digitized song data in a computer memory. Because conventional jukeboxes maintain compact discs or records in the jukebox, theft of the compact disc/records has been a problem, this problem being eliminated by the present invention's utilization of a computer memory to store the digitized song data.

A further object of the present invention is to provide a method and apparatus capable of being used with the remote management of jukeboxes via public telephone lines without interfering with an establishments' use of their own phone lines.

Still a further object of the present invention is to provide a method and apparatus for downloading and storing advertisements to a computer jukebox, and then running the advertisements on a screen associated with the computer jukebox at specified times. Additionally, the jukebox may also be associated with an electronic game so that advertisements not be run on a screen of the electronic game when the game is not being played.

It is a related object of the present invention to track the number of times a particular advertisement is actually run so that the advertiser can be appropriately billed. This information is uploaded to the central control device via the transmission link.

Other objects, features and advantages of the present invention will be readily apparent from the following description of certain preferred embodiments thereof taken



US 6,970,834 B2

3

in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the disclosure.

#### BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWINGS

FIG. 1 is a block diagram of the computer jukebox system of the present invention.

FIG. 2 is an illustration of the data structure of an individual song record stored in a master library catalog illustrated in FIG. 1.

FIG. 3 is a flow-chart illustrating the procedure for storing new songs in a bulk storage unit illustrated in FIG. 1.

FIGS. 4A and B are flow-charts illustrating the software procedures used by the central management system and the jukebox respectively in managing the song library of the jukebox.

FIG. 5 is a flow-chart illustrating the specific operation of the jukebox in interfacing with a user.

#### DETAILED DESCRIPTION OF THE INVENTION

In accordance with the, present invention as shown in FIG. 1, a central management system 11 monitors and updates the available selection of music at a number of remotely located jukeboxes such as a jukebox 13. Particularly, the central management system 11 monitors each jukebox 13 to determine the number of times each song has been played. From these numbers, the central management system 11 can calculate the royalty payments that are due. More importantly, the central management system 11 can identify those specific songs which need to be replaced in each jukebox on an individual basis, the central management system communicating replacement songs to each jukebox 13 to update the available music selection therein as needed.

Each jukebox 13 is basically a computer having sophisticated audio production capability wherein each computer jukebox 13 is programmed to play songs that have been digitally compressed and stored in a large-volume data storage unit 93. The storage unit 93 may be an optical memory or any other available large volume nonvolatile computer memory that provides both read and write access.

The central management system 11 communicates with each computer jukebox 13 via a transmission link 15. The central management system 11 and each jukebox 13 use respective modems 17 and 19 to maintain serial communication on the transmission link 15. The transmission link 15 may be a cable system such as public or private telephone lines or the like. However, the modems 17 and 19 may be replaced with RF (radio frequency) transceivers and associated antennas. In the latter instance the transmission link 15 is an RF link.

Additionally, in another embodiment, an audio codec may be included as part of the central management system 11. The audio codec receives analog audio input, converts it into digital bytes, and then compresses these bytes via known audio compression methods for economic transmission, such as by the commercially available "MUSICAM.RTM." algorithm. The compressed digital audio can then be transmitted to the jukebox 13 by the transmission link 15 which, in addition to the above described system such as telephone lines, cable, RF links or modems, can include transmission via a sub carrier to utilize certain FM channels. In this embodiment, the audio information is transmitted in packets

4

of a predetermined length. Each packet is organized such that a header is transmitted first. The header is followed by the compressed audio data and then by a trailer containing an error detection method to ensure that the audio was transferred properly.

In another embodiment, the central management system 11 transmits the compressed audio data via satellite or cellular telephone systems. In either of these cases, the transmission link 15 is a satellite uplink or a cellular uplink.

In yet another embodiment, the audio information may be stored on a portable infra red device, and the information may be transmitted from the device via infra red rays to the computer jukebox 13. As discussed in more detail below, the central management system 11 can transmit other information, specifically video and graphic information via the transmission link 15 to the computer jukebox 13.

Specifically, the central management system 11 includes a host computer 21 which maintains a master library 23 of songs and associated graphics which are stored in a compressed digital form in a bulk storage unit 25. The bulk storage unit 25 is capable of storing vast amounts of digital data, and may take the form of a read-write optical storage device. The host computer 21 indexes the master library 23 by using a master catalog 27 which is also maintained in the bulk storage unit 25.

The master catalog 27 stores a song record 29, as illustrated in FIG. 2, for each song stored in the master library 23. Each song record 29 associates information in the following fields: a) title field 31, containing the name of the song; b) a classification field 33, containing the type of music, i.e., country, pop, jazz, classical, etc.; c) a song address field 37, containing the beginning address in the bulk storage unit 25 of the compressed digital data of the song; d) a song size field 39, containing the number of bytes in length of the compressed digital data; e) a graphics address field 41, containing the beginning address in the bulk storage unit 25 of the compressed digital data of a graphics image, if any, to be associated with the song; f) a graphics size field 43, containing the number of bytes in length of the compressed graphics image; and g) a play count field 45, containing a count which indicates the number of times this specific song has been played. By parsing the master catalog 27, the host computer 21 can quickly locate all available information relating to any available song. The master catalog 27 also stores data particular to each jukebox such as the number of times each available song has been played, the coin intake for that jukebox, etc. The data particular to each jukebox is uploaded from the jukebox to the central management system 11 to update the master catalog 27.

Returning to FIG. 1, in order to add to the master library 23 and associated master catalog 27, the host computer 21 receives, has compressed and stores in the bulk storage unit 25 digital data representing the new song and associated pictorial graphics. The host computer 21 receives the digital data for storage from three sources: 1) a compact disc read only memory (CDROM) reader 51, which reads CDROMs; 2) a graphics scanner 53, which digitizes pictorial graphic images; and 3) an analog to digital (A/D) reader/converter 55, which reads analog data from both tapes and records and then converts the analog data into digital data. A compression circuit 52 using an adaptive-delta, pulse-code-modulation compression scheme compresses the digital data before it is stored. Other compression schemes may also be used. The compression circuit 52 might also be fully replaced by a software algorithm, such as MUSICAM.RTM., which is executed by the host computer 21.

US 6,970,834 B2

5

FIG. 3 more specifically illustrates the operation of the host computer 21 in adding new songs to the master library 23. At a block 61, the user is initially prompted by the host computer 21 to enter a new song title and category. The host computer 21 writes this information into the title field 31 and classification field 33 of a new song record 29 at a block 63. Next, at a block 65, the host computer 21 prompts the user to place either a CDROM into the reader 51 or a record or tape into the reader/converter 55. After the user has completed this placement, at a block 67 the host computer 21 identifies available storage space in the bulk storage unit 25 by analyzing the space in use as described in the current list of song records 29 in the master catalog 27. The beginning address of this available storage space is placed in the song address field 37 of the new song record 29. Thereafter, at a block 69, the host computer 21 provides a read enable signal on a bus 50 to either the reader 51 or reader/converter 55. Either the reader 51 or reader/converter 55 responds by reading and sending digital data representing the new song to the host computer 21 via the bus 50. Utilizing a bus 54, the host computer 21 forwards the digital data received to the compression circuit 52, receives compressed digital data from the compression circuit 52 and writes the compressed digital data into the bulk storage unit 25. At a block 71, upon reaching the end of the digital data output, i.e., the end of a song, the host computer 21 writes the byte length of the digital output into the song size field 39.

The host computer 21 at a block 73 prompts the user to load a picture, such as an album cover, into the graphics scanner 53. At a block 75, the host computer 21 identifies further available storage space in the bulk storage unit 25 and places the beginning address thereof into the graphics address field 41. Once a picture is loaded, the host computer 21 at block 77, using the bus 50, provides a read enable signal to the scanner 53 which responds via bus 50 by digitizing the picture and transferring the digitized output to the host computer 21. At a block 79, using the bus 54, the host computer 21 forwards the digitized data of the picture to the compression circuit 52, receives compressed digitized data from the compression circuit 52, and writes the compressed digitized data into the bulk storage unit 25. At a block 81, upon reaching the end of the digitized output, i.e., the end of the picture, the host computer 21 places the byte length of the digitized output into the graphics size field 43. Finally, at a block 83, the host computer 21 sets the play count field 45 to zero (0). This flow-chart is repeated as necessary until all of the new songs are added to the master library 27. It is noted that the operator can also delete, modify or replace any specific song record 29 found in the master catalog 27 and master library 23.

Returning to FIG. 1, each computer jukebox 13 plays songs and displays graphics which are stored locally in the large-volume data storage unit 93. The storage unit 93 of the jukebox 13 contains a subset of the songs found in the master library 23 maintained by the central management system 11. More specifically, the storage unit 93 of the jukebox 13 stores a song library 91 which is a corresponding subset of the master library 23. The song library 91 contains all of the currently available song selections and associated pictorial graphics for the jukebox 13. The storage unit 93 also stores a catalog 95 that is an index into the local song library 91. The catalog 95 is similar to the master catalog 27. Both the song library 91 and associated catalog 95 are monitored and updated by the central management system 11 as needed via the transmission link 15. The jukebox 13 permits this monitoring and updating at any time with no impact on its end-user performance.

6

The jukebox 13 also includes a processing circuit 121 which contains a microprocessor 121A, read only memory (ROM) 121B and random access memory (RAM) 121C. As in conventional computer systems, the microprocessor 121A operates in accordance with the software program contained in the ROM 121B and utilizes the RAM 121C for scratch-pad memory. The processing circuit 121 may also contain a decompression circuit (not shown) or may perform decompression using a software algorithm stored in the ROM 121B depending on the type of data compression scheme used by the central management system 11. In either case, decompression is necessary to decompress the compressed data received from the central control system 11 so that the song can be played and associated graphics image displayed.

The processing circuit 121 controls the operation and flow of data into and out of the jukebox 13 through the modem 19 via a bus 124. Using the bus 124, the processing circuit 121 also controls a visual display 125, one or more selection keys 123 and a coin/bill detector 126 to provide the user with an interactive interface to the jukebox 13. The keys 123 provide signals representing user inputs such as displayed song selection. The display 125 displays alpha numeric information as well as pictorial graphics to interface with the user. The coin/bill detector 126 is responsive to one or more coins or bills input by a customer to determine whether the proper amount of money has been input and to provide money detect signals coupled to the processing circuit. The processing circuit 121 further controls, via the bus 124, an audio reproduction circuit 127 coupled to a speaker system 129 along a bus 131 to provide an audio output to the user.

FIGS. 4A and 4B are flow-charts illustrating the software procedures respectively used by the central management system 11 and the jukebox 13 in managing the song library 91 of the jukebox 13. At a block 101, the central management system 11 initiates communication with one of the jukeboxes 13 via the transmission link 15.

Immediately thereafter, at a block 103, the management system 11 requests that the jukebox data be sent including a copy of the catalog 95. At a corresponding block 141, the jukebox 13 responds by sending the copy of the catalog file as well as other jukebox data including total money intake over a period of time. The data sent from the jukebox to the management station may also include customer requests for new songs, a customer utilizing the display and keyboard of the jukebox 13 to enter song request data as discussed below. Thereafter, at a block 105, by examining each play count field 45 in the copy of the catalog 95 received, the management system 11 determines the royalty amount due per song and whether to replace or update specific song entries stored in the jukebox 13. The management system 11 also determines the total money intake from the play count information and compares this value to the total money intake value received from the jukebox to provide a check. At an inquiry block 107, if no replacements are necessary, the management system 11 branches to a block 109 to terminate communication with the jukebox 13. If, however, replacements are necessary, the management system 11 branches to download the changes. Particularly, at a block 111, the management system 11 downloads to the jukebox 13 the song records 29 of both the song to be replaced and the replacement song. In a corresponding block 143, the jukebox 13 replaces the song record 29 in the catalog 95.

Thereafter, the jukebox 13 identifies available storage space in the storage unit 93 based on the song size field 39 of the new song, and writes the beginning address thereof into the song address field 37 in a corresponding block 145. Afterwards, at a block 113, the central management system



US 6,970,834 B2

7

11 downloads the compressed digital data of the song to the jukebox 13. Afterwards, at a block 113 the central management system 11 downloads the compressed digital data of the song to the jukebox 13. At a corresponding block 147, the jukebox 13 receives and writes the data into the song library 91. Next, at a corresponding block 149, the jukebox 13 identifies available storage space in the storage unit 93 based on the graphics size field 43, and writes the beginning address thereof into the graphics address field 41 of the new song. Thereafter, at a block 115, the management system 11 downloads the compressed digitized data of the picture to the jukebox 13. The jukebox, at a corresponding block 151, receives and writes the data into the song library 91. Finally, the block 107 is again encountered. If further replacements need to be made, the blocks 111, 113 and 115 are repeated until complete. At a corresponding block 153, the jukebox similarly repeats the corresponding blocks 143 through 151 until no further replacements need to be made. A further block placed immediately above the block 107 may also be used, wherein the central management system 11 sends a delete, modify, add or replace command to the jukebox 13 before downloading into the song library 93. In this way, the management system 11 receives additional flexibility in updating the jukebox 13. It is noted that the jukebox 13 can also initiate communications with the management system 11 at predetermined times or if the jukebox determines that an event has occurred that the management system 11 should be aware of.

FIG. 5 is a flow-chart illustrating the specific operation of the processing circuit 121 of the jukebox 13 in interfacing with the user. At a block 161, if no song selection is playing, the processing circuit 121 operates in a user attract mode, displaying a random sequence of available graphic images on the visual display 125. More particularly, the processing circuit 121 randomly selects a starting address of the compressed graphics data from the available song records 29 in the catalog 95. From that starting address, the circuit 121 retrieves the data from the song library 91 via the bus 124. The circuit 121 decompresses and transfers the data along the bus 124 to the visual display 125 for display. Thereafter, the circuit 121 again randomly selects a starting address of available graphics data and this cycle repeats. If, however, a song selection is being played when the block 161 is encountered, the attract mode sequencing does not occur. Instead, the circuit 121 displays the associated graphics image of the song being played on the display 125. During the attract mode the processing circuit 121 may also control the display 125 to present a prompt requesting customers to enter new song requests. The new song request data entered by a customer using the keyboard is stored and uploaded to the management system 11 to aid the system 11 in determining whether new song data should be downloaded to the jukebox.

At a block 163, the processing circuit 121 responds to a signal indicating user interest from the selection keys 123 by providing on the display 125 those music categories, i.e., country, rock, jazz, etc., found in the catalog 95. At a block 165, the circuit 121 responds to a signal indicating a category selection from the keys 123 by providing on the display 125 an index of available songs, arranged alphabetically either by artist or title, which can be scrolled and selected using the keys 123. Upon selection of a specific song, the circuit 121 encounters an inquiry block 167. If at the block 167 the circuit 121 determines from the signal received from the money detector 125 that a sufficient amount of money has not been deposited, a branch to a block 169 occurs. At the block 169, using the display 125, the

8

circuit 121 prompts the user to deposit money into the coin/bill detector 126, then branches back to the block 161. However, if sufficient moneys have been deposited, the circuit 121 branches to a block 171 wherein the circuit 121 updates the play count field of the selected song's record in the catalog file 95 and money intake data stored in the memory. The circuit also places the song record 29 corresponding to the selected song into a queue of song records to be played. After the selection is queued, the circuit 121 encounters an inquiry block 153. If the total number of selections purchased have been selected, the circuit 121 branches back to the block 161. Otherwise, if further purchased selections are forthcoming, the circuit 121 branches back to the block 163. In this manner, all of the selections are made and placed in the queue. Upon completion of playing a queued-up, selected song, the circuit 121 removes the corresponding song record 29 from the queue, selects the next song record in the queue, begins to play that next song, and executes the block 161. It is noted that the song queue can be displayed on the display 125 in order to show customers what songs have already been selected prior to making their selection.

More specifically, referring back to FIG. 1, once a specific song has been selected and queued-up, the processing circuit 121 first identifies the beginning address of the compressed digital data from the song address field 37 of the song record 29 in the queue. From this address, using the bus 124, the circuit 121 reads the compressed digital data out of the storage unit 93, decompresses that data, and sends the decompressed digital data to the audio reproduction circuit 127. The audio reproduction circuit 127, commonly found in CDROM readers and associated amplifiers, converts the digital data to an analog signal which is amplified and used to drive the speaker system 129 via the bus 131. After a selected song finishes playing, the processing circuit 121 deletes the song record 29 of the selected song from the queue, increments the play count field 45 associated with that song in the catalog 95, and begins playing the next selected song in the queue if any exists. The process set forth in the flow-chart detailed in FIG. 5 is then repeated.

While the present invention is being described and illustrated in accordance with the preferred embodiment enabling new recordings and computer usage data to be transferred via the transmission line 15, the monitoring and updating may also be directly transferred. In this latter embodiment, routemen physically visit the location of each computer jukebox 13. During these visits, the routemen carry a portable management system 181 which has only a subset of potential replacement songs stored in a subset library and associated catalog (not shown) on a portable bulk storage unit 183. The subset library is loaded by the portable management system 181 onto the portable bulk storage unit 183 either directly from the bulk storage unit 25 or indirectly as is initially done by the central management system 11 (described above). In all other ways, the portable management system 181 operates the same as the central management system 11, collecting the catalog 95 of each jukebox 13 and updating or replacing as necessary. To accomplish this, the portable management system 181 communicates at a very high rate of speed with the jukebox 13 via a parallel communication link 185 and a direct memory access (DMA) link 187.

Additionally, the routemen may simply exchange the "old" storage unit 93 with a pre-loaded storage unit (not shown). The central management system 11 may later read the "old" storage unit 93 to gather the information from the

US 6,970,834 B2

9

catalog 95. Such an embodiment still enjoys the other advantages made possible by the computer jukeboxes 13 described herein.

Additionally, the visual display 125 can be directed to display various advertisements. The advertisements are downloaded from the central management system 11 to selected computer jukeboxes 13 via the transmission link 15. Also downloaded with the advertisements is digital data representing the identity of each advertisement, the number of times, and when each of the advertisements is to be run. The advertisement data is stored at a separate location on the storage unit 93 so that they can be easily located and tracked.

The advertisements like the audio data are preferably sent to the computer jukebox 13 in compressed form, using a known compression scheme. The compressed data is preferably sent in packets that contain a header. The header contains information about the advertisement including how many times a day the advertisement should be run and at what times. The advertisements can then be displayed at the predetermined times on the visual display 125.

In the preferred embodiment, if a conflict arises between a song being played and the time for an advertisement to be played, the conflict is resolved as follows. If the song contains audio only and no associated graphics being shown on the visual display 125, then the advertisement, if it is video only, will be played simultaneously. If the advertisement contains video data and audio data, the advertisement will be run at the next available time slot or be shipped altogether. As each jukebox 13 tracks when an advertisement starts and when it stops, if a particular advertisement is never run, then the central management system will receive such information and the advertiser will be billed accordingly.

The advertisements are also stored in the storage unit 93. Because there is bilateral communication between the central management system 11 and the computer jukeboxes 13, the central management system 11 can track the number of times each advertisement is actually run for billing and royalty purposes by having this information uploaded from the computer jukebox 13 to the central management system 11. The transmission link 15 that's used to download or transmit these advertisements can be any of the means disclosed above, including, modems 17, 19, a cable system, a RF link, a satellite link, a cellular telephone link, or a portable handheld device.

The downloading and storing of advertisements is completed by the same apparatus and method as described above in connection with FIGS. 1 through 5.

In yet another embodiment, the computer jukebox 13 is associated with an electronic game, such as an electronic dart game. In the embodiment, the advertisements are also played on the visual display 125 associated with the electronic game when the game is not being played.

Additionally, it is to be understood that the embodiments of the present invention described hereinabove are merely illustrative and that other modifications and adaptations may be made without departing from the scope of the appended claims.

What is claimed is:

1. A computer jukebox receiving and storing digital advertisement data representing a plurality of advertisements from a remote source, data representing the identity of each of said advertisements, and data representing when and the number of times each of said advertisements is to be run, comprising:

10

a display associated with said jukebox, said display allowing a user to retrieve and play a signal representing a song selected from a plurality of songs stored in said jukebox;

a communication interface receiving said advertisement data from the remote source, said data including (i) the identity of each of said advertisements, (ii) when and the number of times each of said advertisements is to be run, said computer jukebox downloading said advertisement data from a transmission link that allows bi-directional communication between a remote central management system and said communication interface of said computer jukebox;

a programmable computer memory storing said digital advertisement data; and

a processor displaying one of said plurality of advertisements on said display when said jukebox is not generating a signal representing a song selected from said plurality of songs stored in said jukebox, wherein said processor is responsive to said data representing when and the number of times each of said advertisements is to be run.

2. The computer jukebox of claim 1, wherein said communication interface includes at least one of a modem, a radio frequency receiver, a direct interface port, a portable infra red device, a satellite receiver, and cellular telephone receiver.

3. A computer jukebox network comprising:

song data representing a plurality of songs;

advertisement data representing at least one advertisement;

a central management system including a host computer and a programmable memory storing said song data representing the plurality of songs, said programmable memory also storing said advertisement data representing the at least one advertisement;

a computer jukebox remotely located from said central management system, said computer jukebox including a processor and a data storage unit, said data storage unit having a song storage location storing song data and an advertisement storage location receiving advertisement data, wherein said processor runs said at least one advertisement represented by said advertisement data downloaded from said central management system when said computer jukebox is not generating a signal representing a song selected from a plurality of songs within said song data stored in said song storage location; and

a transmission link allowing bi-directional communication between said central management system and said computer jukebox, said computer jukebox downloading said song data from said central management system by way of said transmission link and storing said song data in said song storage location of said data storage unit, said computer jukebox downloading said advertisement data from said central management system by way of said transmission link and storing said advertisement data in said advertisement storage location of said data storage unit.

4. The computer jukebox network of claim 3, wherein said processor runs said at least one advertisement downloaded as advertisement data from said central management system on a visual display.

5. The computer jukebox network of claim 3, wherein said central management system uploads information from said computer jukebox by way of said transmission link, wherein



US 6,970,834 B2

11

said information includes the number of times said at least one advertisement is run by said computer jukebox.

6. The computer jukebox network of claim 3, wherein at least one of said central processor and said jukebox processor tracks the number of times said at least one advertisement is run by said computer jukebox. 5

7. The computer jukebox network of claim 3, wherein said advertisement data comprises digital data representing an identity of said at least one advertisement, and a number of times and when said at least one advertisement is to be run by said computer jukebox. 10

8. The computer jukebox network of claim 3, further comprising an electronic game having a visual display, wherein said electronic game is associated with said computer jukebox, and wherein said at least one advertisement is displayed on said visual display. 15

9. The computer jukebox network of claim 3, wherein said processor presents user attract data on a display, wherein said user attract data is based on a song stored within said song data in said song storage location of said data storage unit. 20

10. A computer jukebox receiving and storing advertisement data representing at least one advertisement from a remote central management system by way of a transmission link between, the computer jukebox and the central management system, said computer jukebox comprising: 25

- advertisement data;
- a communication interface receiving said advertisement data from the remote central management system by way of the transmission link;
- a programmable memory storing said advertisement data; and 30
- a processor running said at least one advertisement according to said advertisement data, wherein said advertisement data includes an identity of at least one advertisement, and wherein said advertisement data 35

12

includes at least one time for said at least one advertisement to be run by said computer jukebox, wherein said processor runs said at least one advertisement according to said advertisement data when said jukebox is not generating a signal representing a song selected from a plurality of songs stored in said jukebox.

11. The computer jukebox of claim 10, further comprising a visual display, wherein said processor runs said at least one advertisement on said visual display.

12. The computer jukebox of claim 10, wherein said programmable memory includes a song storage unit for storing song data and an advertisement storage unit for storing said advertisement data downloaded from the central management system.

13. The computer jukebox of claim 10, wherein said computer jukebox communicates bi-directionally with the central management system by way of the transmission link.

14. The computer jukebox of claim 10, wherein the central management system uploads information from said computer jukebox, wherein said information includes the number of times each of the plurality of advertisements is run by said computer jukebox.

15. The computer jukebox of claim 10, wherein said processor tracks the number of times said at least one advertisement is run by said computer jukebox.

16. The computer jukebox of claim 10, further comprising an electronic game having a visual display, wherein said electronic game is associated with said computer jukebox, and wherein said at least one advertisement is displayed on said visual display.

17. The computer jukebox of claim 10, wherein said processor presents user attract data on a display, wherein said user attract data is based on a song being played by said computer jukebox.

\* \* \* \* \*

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 6,970,834 B2  
APPLICATION NO. : 10/300147  
DATED : November 29, 2005  
INVENTOR(S) : John R. Martin, Michael L. Tillery and Samuel N. Zammuto

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title Page, Item (75)  
Inventors, delete "Samuel N. Zammuto."

Signed and Sealed this

Thirteenth Day of March, 2007

A handwritten signature in black ink, appearing to read "Jon W. Dudas". The signature is stylized with a large, looped initial "J" and a distinct "D" and "Dudas" at the end.

JON W. DUDAS  
*Director of the United States Patent and Trademark Office*

# **Exhibit G**





US006397189B1

(12) **United States Patent**  
**Martin et al.**

(10) Patent No.: **US 6,397,189 B1**

(45) Date of Patent: **\*May 28, 2002**

(54) **COMPUTER JUKEBOX AND JUKEBOX NETWORK**

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Primary Examiner—James P. Trammell

Assistant Examiner—Calvin L. Hewitt, II

(74) Attorney, Agent, or Firm—McAndrews, Held & Malloy, Ltd.

(57)

#### ABSTRACT

A central management system manages a plurality of computer jukeboxes and communicates compressed digital data with each jukebox via a transmission link. The management system also includes a host computer that maintains a master set of compressed digital data representing a plurality of songs, song associated graphics, and song identity information. Each jukebox includes a storage unit that is capable of storing a subset of the master set and a processing circuit having a decompression circuit. The processing circuit controls the operation and flow of digital data into and out of the jukebox through the transmission link as well as a visual song information display, user song selection keys, a money detector, and an audio reproduction circuit coupled to a speaker system so as to provide audio output to users of the jukebox.

11 Claims, 5 Drawing Sheets

This patent is subject to a terminal disclaimer.

(21) Appl. No.: 09/076,849

(22) Filed: May 12, 1998

#### Related U.S. Application Data

(63) Continuation of application No. 08/584,253, filed on Jan. 11, 1996, now Pat. No. 5,781,889, which is a continuation of application No. 08/268,782, filed on Jun. 30, 1994, now abandoned, which is a division of application No. 07/846,707, filed on Mar. 6, 1992, now Pat. No. 5,355,302, which is a continuation-in-part of application No. 07/538,981, filed on Jun. 15, 1990, now abandoned.

(51) Int. Cl.<sup>7</sup> ..... G06F 17/60

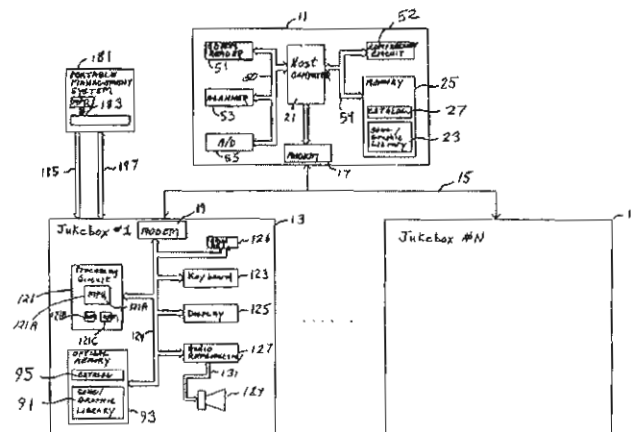
(52) U.S. Cl. .... 705/1; 705/50; 705/51;  
 705/26

(58) Field of Search ..... 705/1, 16, 28,  
 705/50, 51, 52, 10, 21, 22

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U.S. Patent

May 28, 2002

Sheet 1 of 5

US 6,397,189 B1

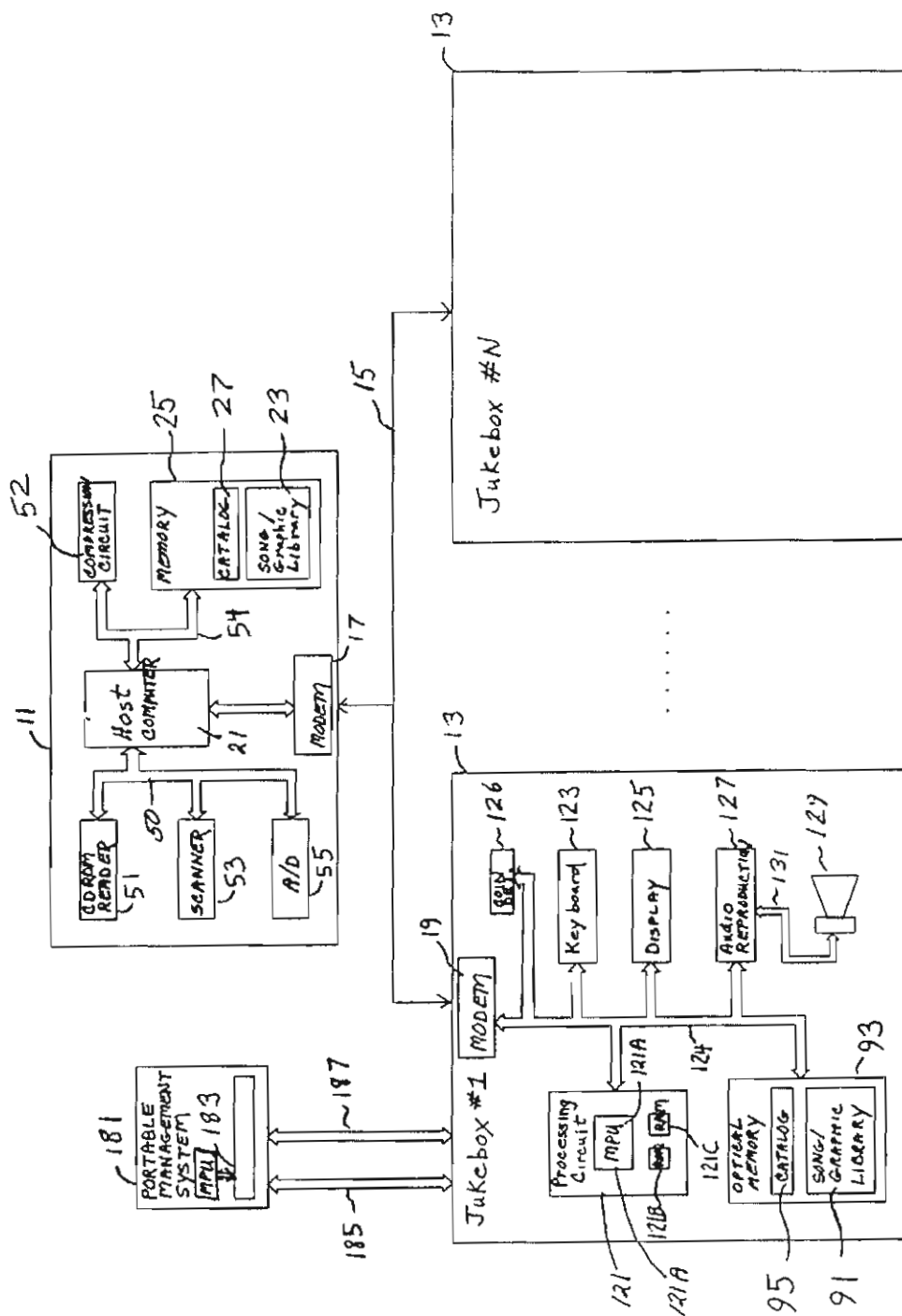


FIG. 1

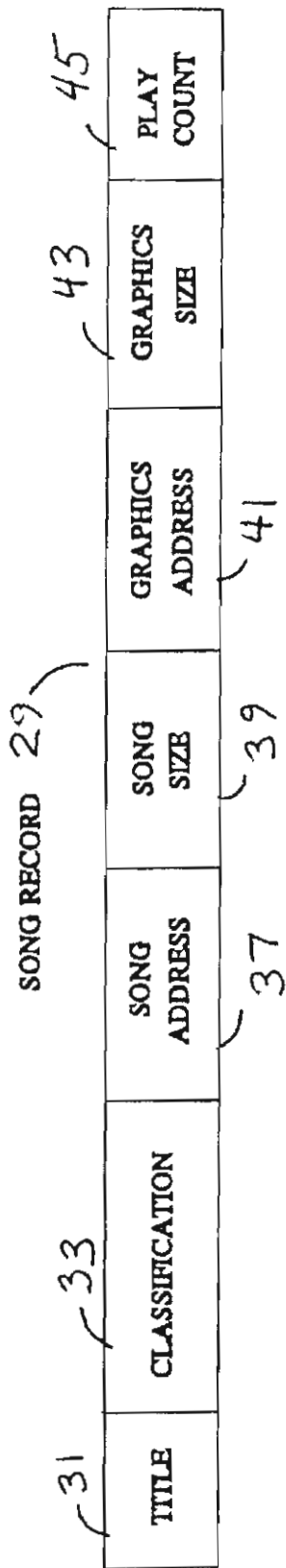


FIG. 2



U.S. Patent

May 28, 2002

Sheet 3 of 5

US 6,397,189 B1

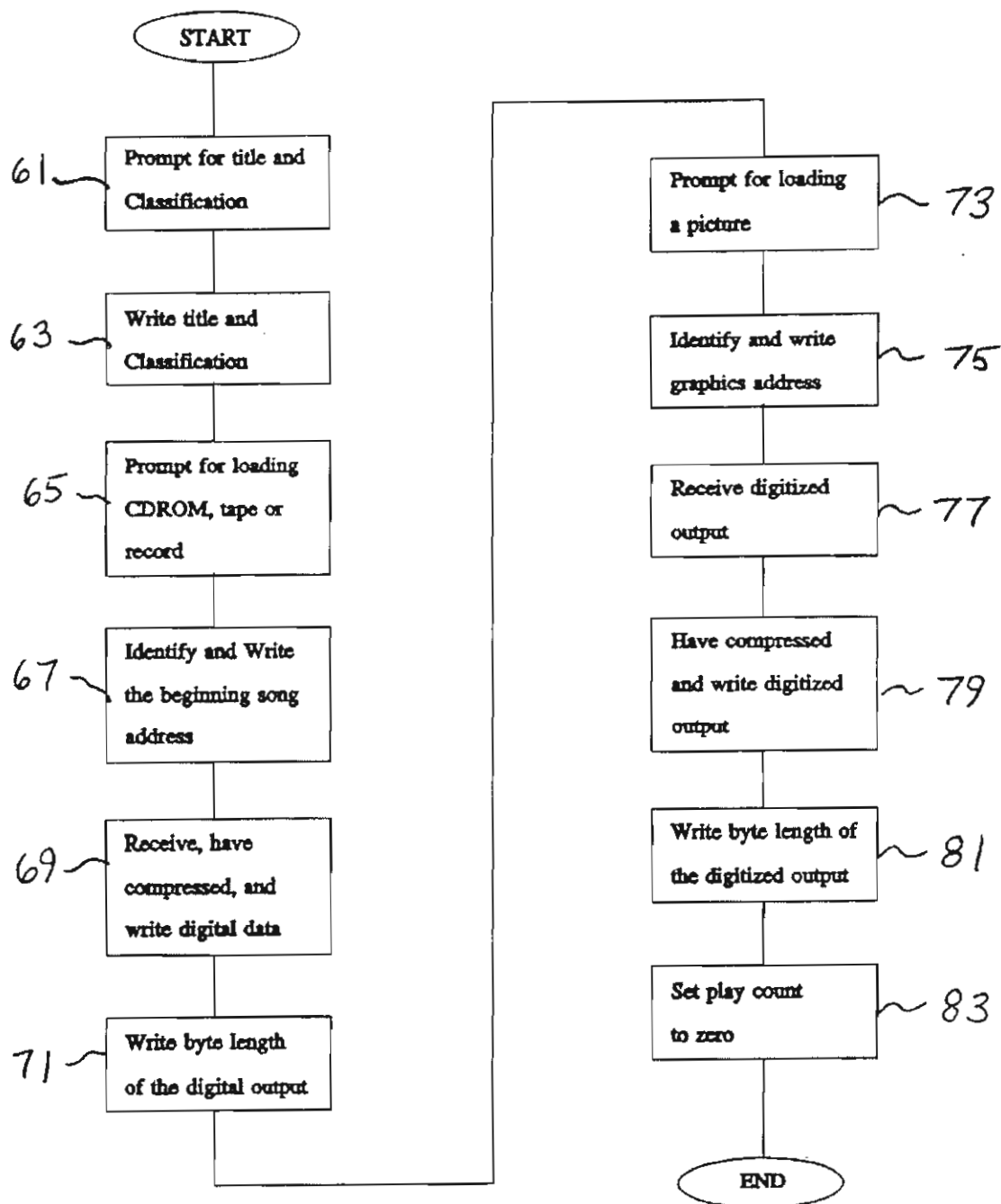


FIG. 3

U.S. Patent

May 28, 2002

Sheet 4 of 5

US 6,397,189 B1

FIG 4A

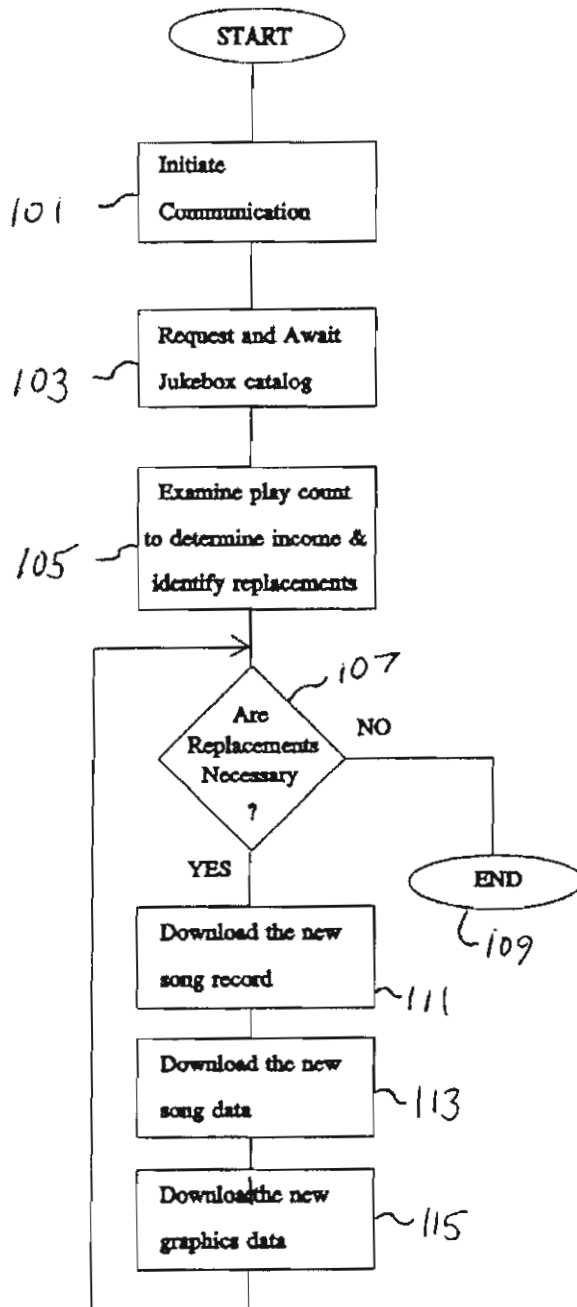
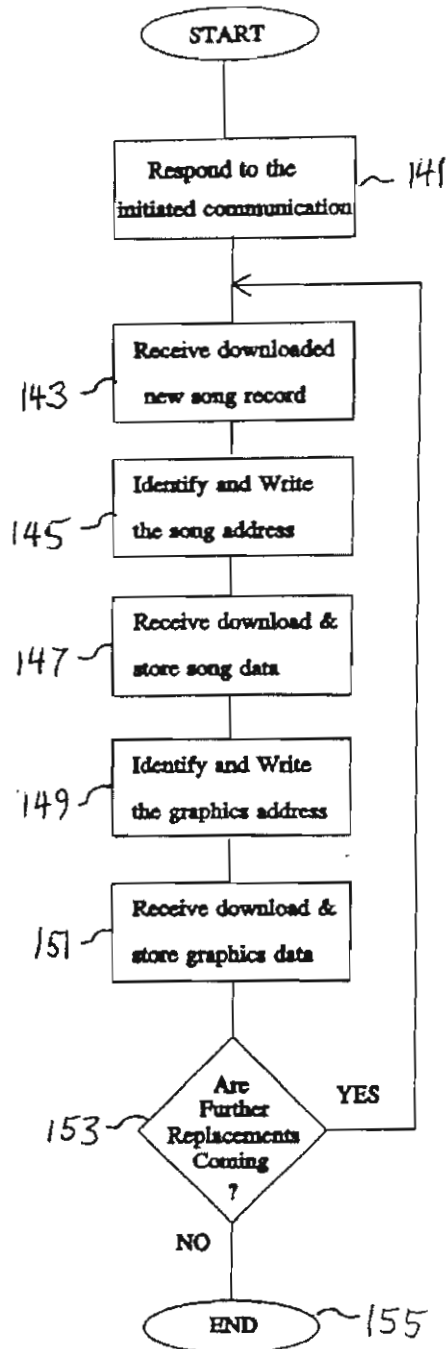


FIG 4B



U.S. Patent

May 28, 2002

Sheet 5 of 5

US 6,397,189 B1

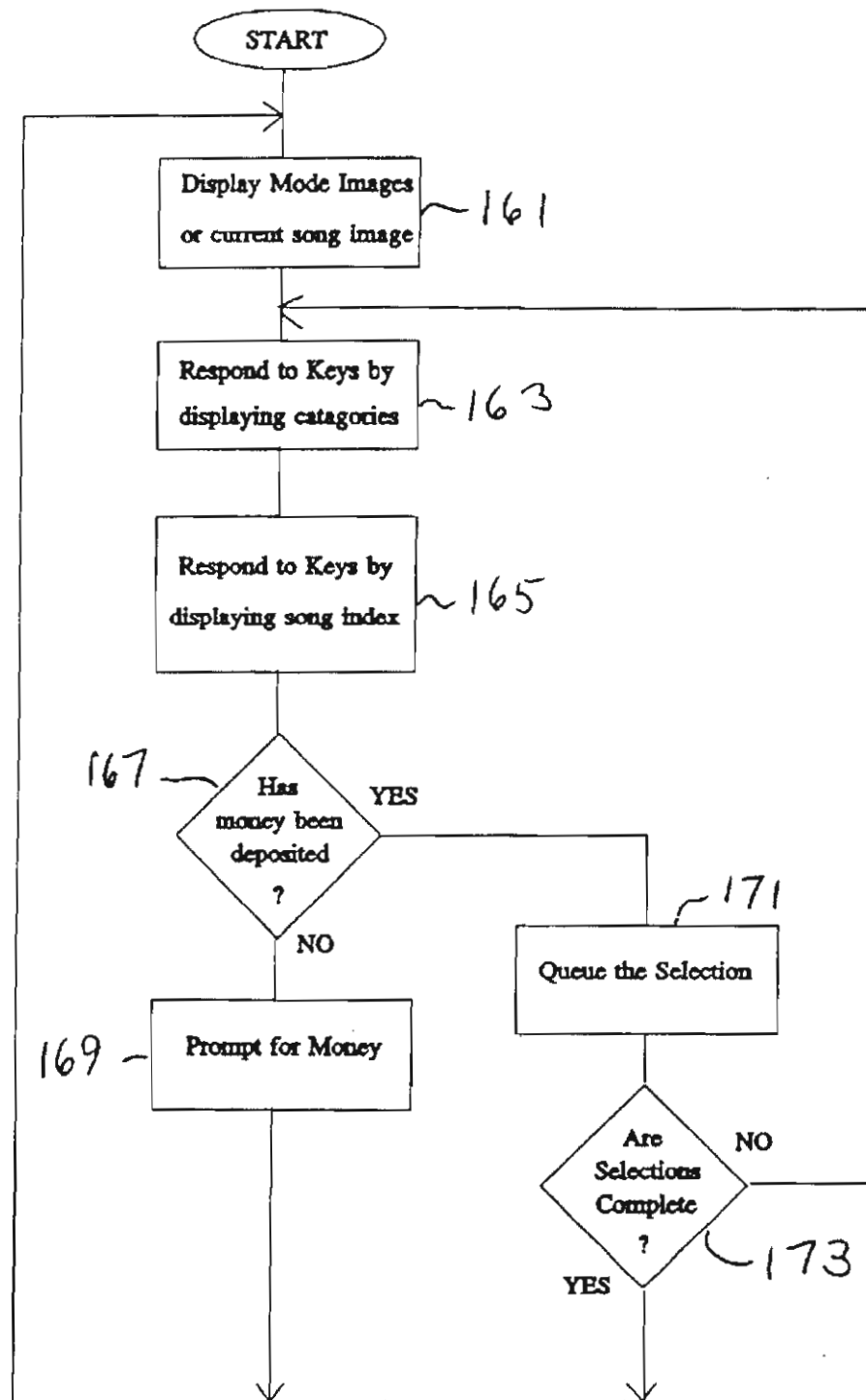


FIG. 5

US 6,397,189 B1

1

## COMPUTER JUKEBOX AND JUKEBOX NETWORK

This application is a continuation of U.S. patent application Ser. No. 08/584,253 filed Jan. 11, 1996, allowed Dec. 24, 1997, now U.S. Pat. No. 5,781,889, which is a continuation of U.S. patent application Ser. No. 08/268,782 filed Jun. 30, 1994, now abandoned, which is a division of U.S. patent application Ser. No. 07/846,707, filed Mar. 6, 1992, now U.S. Pat. No. 5,355,302, which is a continuation-in-part of U.S. application Ser. No. 07/538,981, filed Jun. 15, 1990, now abandoned.

### FIELD OF THE INVENTION

The present invention relates generally to a jukebox system, and more particularly to such a system including one or more computer jukeboxes that can be managed from a remote location.

### BACKGROUND OF THE INVENTION

Heretofore, an assortment of musical recordings found in a jukebox consists of a plurality of records, each record containing a specific recording. Traditionally, these records are grooved phonograph records. After a patron makes a selection, the selected phonograph record is mechanically removed from a storage rack within the jukebox, and the phonograph record is placed upon rotating platform. A stylus which is connected to a speaker system is then placed upon the rotating phonograph record, resulting in the phonograph record being played by the jukebox. For each selection, a separate phonograph record must be removed from the storage rack in order to be played by the jukebox.

Conventional jukeboxes have also implemented compact disks as means for creating an assortment of musical songs. Compact disks provide the improved sound quality made possible by digital recordings. The same technique, however, is used to play compact disks. A separate compact disk corresponding to each selection must be removed from a storage rack in order for the jukebox to play the selection.

Updating conventional jukeboxes is a costly and time consuming task. Routemen must periodically travel to each jukebox location and replace the existing recordings of each jukebox with up-to-date records. The existing recordings are no longer used by the jukebox once removed, thus making the conventional method wasteful.

Routemen must also travel to each jukebox location to keep a tally of the number of times each musical recording is selected in order to determine royalty fees. It is known to provide a jukebox with a counter that keeps track of the number of times each musical recording is selected, but routemen must still travel to each jukebox location to obtain this information. Such a process requires an excessive number of people to visit jukebox location periodically and visually read the information off the counter within each jukebox. Since the number of jukeboxes in operation is quite large, the employment of routemen to obtain such data involves a considerable expense. Furthermore, the ever changing nature of the recording industry requires that such data be gathered frequently in order to keep abreast of a continually changing market.

### OBJECTS AND SUMMARY OF THE INVENTION

Accordingly, it is a primary object of the present invention to provide a method and apparatus for managing a plurality

2

of computer jukeboxes which is capable of eliminating the necessity for routemen to change records in the jukeboxes. The computer jukeboxes store recordings in memory, thus enabling routemen to simply load new recordings into the memory of each computer jukebox.

Another object of the present invention is to eliminate a necessity for routemen by enabling new recordings and selection menus to be downloaded to each computer jukebox via a transmission link. In that regard, it is an object of the present invention to provide a method and apparatus which eliminates the material waste usually associated with updating jukeboxes. Instead of throwing away old recordings and replacing them with new ones, as is the conventional procedure, the present invention eliminates this waste by enabling new recordings to simply be downloaded into the memory of each computer jukebox. The old recordings are simply erased, if necessary.

Another object of the present invention is to provide a method and apparatus which is capable of remotely obtaining jukebox usage data, thus eliminating a necessity for routemen to do this task. The present invention utilizes a computer jukebox, which as part of its software programming, stores the number of times each musical recording is played and the number of credits that have been awarded. This data is uploaded to a central control device via a transmission link.

An additional object of the present invention is to provide a method and apparatus utilizing modern computer technology to digitally store and play musical records. The jukebox of the present invention is basically a computer having a sophisticated audio production capability, the computer storing digitized song data in a computer memory. Because conventional jukeboxes maintain compact discs or records in the jukebox, theft of the compact disc/records has been a problem, this problem being eliminated by the present invention's utilization of a computer memory to store the digitized song data.

A further object of the present invention is to provide a method and apparatus capable of being used with the remote management of jukeboxes via public telephone lines without interfering with establishments' use of their own phone lines.

Other objects, features and advantages of the present invention will be readily apparent from the following description of certain preferred embodiments thereof taken in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the disclosure.

### BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a block diagram of the computer jukebox system of the present invention;

FIG. 2 is an illustration of the data structure of an individual song record stored in a master library catalog illustrated in FIG. 1;

FIG. 3 is a flow-chart illustrating the procedure for storing new songs in a bulk storage unit illustrated in FIG. 1;

FIGS. 4A and B are flow-charts illustrating the software procedures used by the central management system and the jukebox respectively in managing the song library of the jukebox; and

FIG. 5 is a flow-chart illustrating the specific operation of the jukebox in interfacing with a user.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

In accordance with the present invention as shown in FIG. 1, a central management system 11 monitors and updates the



US 6,397,189 B1

3

available selection of music at a number of remotely located jukeboxes such as a jukebox 13. Particularly, the central management system 11 monitors each jukebox 13 to determine the number of times each song has been played. From these numbers, the central management system 11 can calculate the royalty payments that are due. More importantly, the central management system 11 can identify those specific songs which need to be replaced in each jukebox on an individual basis, the central management system communicating replacement songs to each jukebox 13 to update the available music selection therein as needed.

Each jukebox 13 is basically a computer having sophisticated audio production capability wherein each computer jukebox 13 is programmed to play songs that have been digitally compressed and stored in a large-volume data storage unit 93. The storage unit 93 may be an optical memory or any other available large volume nonvolatile computer memory that provides both read and write access.

The central management system 11 communicates with each computer jukebox 13 via a transmission link 15. The central management system 11 and each jukebox 13 use respective modems 17 and 19 to maintain serial communication on the transmission link 15. The transmission link 15 may be a cable system such as public or private telephone lines or the like. However, the modems 17 and 19 may be replaced with RF (radio frequency) transceivers and associated antennas. In the latter instance the transmission link 15 is an RF link.

Specifically, the central management system 11 includes a host computer 21 which maintains a master library 23 of songs and associated graphics which are stored in a compressed digital form in a bulk storage unit 25. The bulk storage unit 25 is capable of storing vast amounts of digital data, and may be take the form of a read-write optical storage device. The host computer 21 indexes the master library 23 by using a master catalog 27 which is also maintained in the bulk storage unit 25.

The master catalog 27 stores a song record 29, as illustrated in FIG. 2, for each song stored in the master library 23. Each song record 29 associates information in the following fields: a) a title field 31, containing the name of the song; b) a classification field 33, containing the type of music, i.e., country, pop, jazz, classical etc.; c) a song address field 37, containing the beginning address in the bulk storage unit 25 of the compressed digital data of the song; d) a song size field 39, containing the number of bytes in length of the compressed digital data; e) a graphics address field 41, containing the beginning address in the bulk storage unit 25 of the compressed digital data of a graphics image, if any, to be associated with the song; f) a graphics size field 43, containing the number of bytes in length of the compressed graphics image; and g) a play count field 45, containing a count which indicates the number of times this specific song has been played. By parsing the master catalog 27, the host computer 21 can quickly locate all available information relating to any available song. The master catalog 27 also stores data particular to each jukebox such as the number of times each available song has been played, the coin intake for that jukebox, etc. The data particular to each jukebox is uploaded from the jukebox to the central management system 11 to update the master catalog 27.

Returning to FIG. 1, in order to add to the master library 23 and associated master catalog 27, the host computer 21 receives, has compressed and stores in the bulk storage unit 25 digital data representing the new song and associated pictorial graphics. The host computer 21 receives the digital

4

data for storage from three sources: 1) a compact disc read only memory (CDROM) reader 51, which reads CDROMs; 2) a graphics scanner 53, which digitizes pictorial graphic images; and 3) an analog to digital (A/D) reader/converter 55, which reads analog data from both tapes and records and then converts the analog data into digital data. A compression circuit 52 using an adaptive-delta, pulse-code-modulation compression scheme compresses the digital data before it is stored. Other compression schemes may also be used. The compression circuit 52 might also be fully replaced by a software algorithm which is executed by the host computer 21.

FIG. 3 more specifically illustrates the operation of the host computer 21 in adding new songs to the master library 23. At a block 61, the user is initially prompted by the host computer 21 to enter a new song title and category. The host computer 21 writes this information into the title field 31 and classification field 33 of a new song record 29 at a block 63. Next, at a block 65, the host computer 21 prompts the user to place either a CDROM into the reader 51 or a record or tape into the reader/converter 55. After the user has completed this placement, at a block 67 the host computer 21 identifies available storage space in the bulk storage unit 25 by analyzing the space in use as described in the current list of song records 29 in the master catalog 23. The beginning address of this available storage space is placed in the song address field 37 of the new song record 29. Thereafter, at a block 69, the host computer 21 provides a read enable signal on a bus 50 to either the reader 51 or reader/converter 55. Either the reader 51 or reader/converter 55 responds by reading and sending digital data representing the now song to the host computer 21 via the bus 50. Utilizing a bus 54, the host computer 21 forwards the digital data received to the compression circuit 52, receives compressed digital data from the compression circuit 52 and writes the compressed digital data into the bulk storage unit 25. At a block 71, upon reaching the end of the digital data output, i.e., the end of a song, the host computer 21 writes the byte length of the digital output into the song size field 39.

The host computer 21 at a block 73 prompts the user to load a picture, such as an album cover, into the graphics scanner 53. At a block 75, the host computer 21 identifies further available storage space in the bulk storage unit 25 and places the beginning address thereof into the graphics address field 41. Once a picture is loaded, the host computer 21 at block 77, using the bus 50, provides a read enable signal to the scanner 53 which responds via bus 50 by digitizing the picture and transferring the digitized output to the host computer 21. At a block 79, using the bus 54, the host computer 21 forwards the digitized data of the picture to the compression circuit 52, receives compressed digitized data from the compression circuit 52, and writes the compressed digitized data into the bulk storage unit 25. At a block 81, upon reaching the end of the digitized output, i.e., the end of the picture, the host computer 21 places the byte length of the digitized output into the graphics size field 43. Finally, at a block 83, the host computer 21 sets the play count field 45 to zero (0). This flow-chart is repeated as necessary until all of the new songs are added to the master library 27. It is noted that the operator can also delete, modify or replace any specific song record 29 found in the master catalog 23 and master library 27.

Returning to FIG. 1, each computer jukebox 13 plays songs and displays graphics which are stored locally in the large-volume data storage unit 93. The storage unit 93 of the jukebox 13 contains a subset of the songs found in the master library 27 maintained by the central management



US 6,397,189 B1

5

system 11. More specifically, the storage unit 93 of the jukebox 13 stores a song library 91 which is a corresponding subset of the master library 27. The song library 91 contains all of the currently available song selections and associated pictorial graphics for the jukebox 13. The storage unit 93 also stores a catalog 95 that is an index into the local song library 91. The catalog 95 is similar to the master catalog 23. Both the song library 91 and associated catalog 95 are monitored and updated by the central management system 11 as needed via the transmission link 15. The jukebox 13 permits this monitoring and updating at any time with no impact on its end-user performance.

The jukebox 13 also includes a processing circuit 121 which contains a microprocessor 121A, read only memory (ROM) 121B and random access memory (RAM) 121C. As in conventional computer systems, the microprocessor 121A operates in accordance with the software program contained in the ROM 121B and utilizes the RAM 121C for scratch-pad memory. The processing circuit 121 may also contain a decompression circuit (not shown) or may perform decompression using a software algorithm stored in the ROM 121B depending on the type of data compression scheme used by the central management system 11. In either case, decompression is necessary to decompress the compressed data received from the central control system 11 so that the song can be played and associated graphics image displayed.

The processing circuit 121 controls the operation and flow of data into and out of the jukebox 13 through the modem 19 via a bus 124. Using the bus 124, the processing circuit 121 also controls a visual display 125, one or more selection keys 123 and a coin/bill detector 126 to provide the user with an interactive interface to the jukebox 13. The keys 123 provide signals representing user inputs such as displayed song selection. The display 125 displays alpha numeric information as well as pictorial graphics to interface with the user. The coin/bill detector 126 is responsive to one or more coins or bills input by a customer to determine whether the proper amount of money has been input and to provide money detect signals coupled to the processing circuit. The processing circuit 121 further controls, via the bus 124, an audio reproduction circuit 127 coupled to a speaker system 129 along a bus 131 to provide an audio output to the user.

FIGS. 4A and 4B are flow-charts illustrating the software procedures respectively used by the central management system 11 and the jukebox 13 in managing the song library 91 of the jukebox 13. At a block 101, the central management system 11 initiates communication with one of the jukeboxes 13 via the transmission link 15. Immediately thereafter, at a block 103, the management system 11 requests that the jukebox data be sent including a copy of the catalog 95. At a corresponding block 141, the jukebox 13 responds by sending the copy of the catalog file as well as other jukebox data including total money intake over a period of time. The data sent from the jukebox to the management station may also include customer requests for new songs, a customer utilizing the display and keyboard of the jukebox 13 to enter song request data as discussed below. Thereafter, at a block 105, by examining each play count field 45 in the copy of the catalog 95 received, the management system 11 determines the royalty amount due per song and whether to replace or update specific song entries stored in the jukebox 13. The management system 11 also determines the total money intake from the play count information and compares this value to the total money intake value received from the jukebox to provide a check. At an inquiry block 107, if no replacements are necessary, the management system 11 branches to a block 109 to terminate

6

communication with the jukebox 12. If, however, replacements are necessary, the management system 11 branches to download the changes. Particularly, at a block 111, the management system 11 downloads to the jukebox 13 the song records 29 of both the song to be replaced and the replacement song. In a corresponding block 143, the jukebox 13 replaces the song record 29 in the catalog 95. Thereafter, the jukebox 13 identifies available storage space in the storage unit 93 based on the song size field 39 of the new song, and writes the beginning address thereof into the song address field 37 in a corresponding block 145. Afterwards, at a block 113, the central management system 11 downloads the compressed digital data of the song to the jukebox 13. At a corresponding block 147, the jukebox 13 receives and writes the data into the song library 91. Next, at a corresponding block 149, the jukebox 13 identifies available storage space in the storage unit 93 based on the graphics size field 43, and writes the beginning address thereof into the graphics address field 41 of the new song. Thereafter, at a block 115, the management system 11 downloads the compressed digitized data of the picture to the jukebox 13. The jukebox, at a corresponding block 151, receives and writes the data into the song library 91. Finally, the block 107 is again encountered. If further replacements need to be made, the blocks 111, 113 and 115 are repeated until complete. At a corresponding block 153, the jukebox similarly repeats the corresponding blocks 143 through 151 until no further replacements need to be made. A further block placed immediately above the block 107 may also be used, wherein the central management system 11 sends a delete, modify, add or replace command to the jukebox 13 before downloading into the song library 93. In this way, the management system 11 receives additional flexibility in updating the jukebox 13. It is noted that the jukebox 13 can also initiate communications with the management system 11 at predetermined times or if the jukebox determines that an event has occurred that the management system 11 should be aware of.

FIG. 5 is a flow-chart illustrating the specific operation of the processing circuit 121 of the jukebox 13 in interfacing with the user. At a block 161, if no song selection is playing, the processing circuit 121 operates in a user attract mode, displaying a random sequence of available graphic images on the visual display 125. More particularly, the processing circuit 121 randomly selects a starting address of the compressed graphics data from the available song records 29 in the catalog 95. From that starting address, the circuit 121 retrieves the data from the song library 91 via the bus 124. The circuit 121 decompresses and transfers the data along the bus 124 to the visual display 125 for display. Thereafter, the circuit 121 again randomly selects a starting address of available graphics data and this cycle repeats. If, however, a song selection is being played when the block 161 is encountered, the attract mode sequencing does not occur. Instead, the circuit 121 displays the associated graphics image of the song being played on the display 125. During the attract mode the processing circuit 121 may also control the display 125 to present a prompt requesting customers to enter new song requests. The new song request data entered by a customer using the keyboard is stored and uploaded to the management system 11 to aid the system 11 in determining whether new song data should be downloaded to the jukebox.

At a block 163, the processing circuit 121 responds to a signal indicating user interest from the selection keys 123 by providing on the display 125 those music categories, i.e., country, rock, jazz, etc., found in the catalog 95. At a block

US 6,397,189 B1

7

165, the circuit 121 responds to a signal indicating a category selection from the keys 123 by providing on the display 125 an index of available songs, arranged alphabetically either by artist or title, which can be scrolled and selected using the keys 123. Upon selection of a specific song, the circuit 121 encounters an inquiry block 167. If at the block 167 the circuit 121 determines from the signal received from the money detector 125 that a sufficient amount of money has not been deposited, a branch to a block 169 occurs. At the block 169, using the display 125, the circuit 121 prompts the user to deposit money into the coin/bill detector 126, then branches back to the block 161. However, if sufficient moneys have been deposited, the circuit 121 branches to a block 171 wherein the circuit 121 updates the play count field of the selected song's record in the catalog file 95 and money intake data stored in the memory. The circuit also places the song record 29 corresponding to the selected song into a queue of song records to be played. After the selection is queued, the circuit 121 encounters an inquiry block 153. If the total number of selections purchased have been selected, the circuit 121 branches back to the block 161. Otherwise, if further purchased selections are forthcoming, the circuit 121 branches back to the block 163. In this manner, all of the selections are made and placed in the queue. Upon completion of playing a queued-up, selected song, the circuit 121 removes the corresponding song record 29 from the queue, selects the next song record in the queue, begins to play that next song, and executes the block 161. It is noted that the song queue can be displayed on the display 125 in order to show customers what songs have already been selected prior to making their selection.

More specifically, referring back to FIG. 1, once a specific song has been selected and queued-up, the processing circuit 121 first identifies the beginning address of the compressed digital data from the song address field 37 of the song record 29 in the queue. From this address, using the bus 124, the circuit 121 reads the compressed digital data out of the storage unit 93, decompresses that data, and sends the decompressed digital data to the audio reproduction circuit 127. The audio reproduction circuit 127, commonly found in CDROM readers and associated amplifiers, converts the digital data to an analog signal which is amplified and used to drive the speaker system 129 via the bus 131. After a selected song finishes playing, the processing circuit 121 deletes the song record 29 of the selected song from the queue, increments the play count field 45 associated with that song in the catalog 95, and begins playing the next selected song in the queue if any exists. The process set forth in the flow-chart detailed in FIG. 5 is then repeated.

While the present invention is being described and illustrated in accordance with the preferred embodiment enabling new recordings and computer usage data to be transferred via the transmission line 15, the monitoring and updating may also be directly transferred. In this latter embodiment, routemen physically visit the location of each computer jukebox 13. During these visits, the routemen carry a portable management system 181 which has only a subset of potential replacement songs stored in a subset library and associated catalog (not shown) on a portable bulk storage unit 183. The subset library is loaded by the portable management system 181 onto the portable bulk storage unit 183 either directly from the bulk storage unit 25 or indirectly as is initially done by the central management system 11 (described above). In all other ways, the portable management system 181 operates the same as the central management system 11, collecting the catalog 95 of each jukebox 13

8

and updating or replacing as necessary. To accomplish this, the portable management system 181 communicates at a very high rate of speed with the jukebox 13 via a parallel communication link 185 and a direct memory access (DMA) link 187.

Additionally, the routemen may simply exchange the "old" storage unit 93 with a pre-loaded storage unit (not shown). The central management system 11 may later read the "old" storage unit 93 to gather the information from the catalog 95. Such an embodiment still enjoys the other advantages made possible by the computer jukeboxes 13 described herein.

Additionally, it is to be understood that the embodiments of the present invention described hereinabove are merely illustrative and that other modifications and adaptations may be made without departing from the scope of the appended claims.

What is claimed is:

1. An improved computer jukebox for playing songs selected by users of the computer jukebox from a library of songs that have been digitally compressed and stored in the computer jukebox, where the library of songs stored in the computer jukebox is capable of being updated upon the receipt of compressed digital song data, which represents at least one song, and upon the receipt of song identity data, which represents the identity of each such song, the computer jukebox comprising:

- a communication interface for receiving the compressed digital song data and the song identity data;
  - a data storage unit for storing the received compressed digital song data and the received song identity data for each of the songs stored;
  - a display for showing, to prospective user of the computer jukebox, information identifying the songs for which digital song data is stored in the data storage unit and that is based on song identity data;
  - selection keys responsive to a selection of a song to be played on the computer jukebox from the song identity information displayed on the display, the selection keys including a signal output representing activation of the selection keys;
  - at least one audio speaker;
  - a processor connected to a memory, the memory including a decompression algorithm for decompressing compressed digital song data;
  - a digital to analog converter coupled between the processor and the audio speaker to convert digital song data to an analog signal coupled to the speaker; and
- wherein the memory further includes instructions for:
- causing the processor, in response to the signal output, to access and process compressed digital song data retrieved from the data storage unit so that the accessed compressed digital song data corresponds to the song selected by the selection keys;
  - causing the processor to decompress the accessed compressed digital song data and send the decompressed digital song data to the digital to analog converter so that the song selected is played on the computer jukebox as a result of the corresponding stored compressed song digital data being decompressed and converted by the processor and the digital to analog converter; and
  - causing the processor to respond to compressed digital song data and to song identity data, which may be received by the communication interface of the com-



US 6,397,189 B1

9

puter jukebox, to control the storage of the received compressed digital song data and the received song identity data in the data storage unit to create an updated library of songs stored in the computer jukebox.

2. The computer jukebox of claim 1, wherein the memory further comprises instructions causing the processor to respond to control the information shown on the display to include the updated library of songs, instructions causing the processor to store song usage data generated upon the playing of a song, and wherein the communications interface includes a transmitter for transmitting song the song usage data under the control of the processor.

3. The computer jukebox of claim 1, wherein the data storage unit stores compressed pictorial graphics, received by the communication interface, and associated with the compressed digital song data.

4. The computer jukebox of claim 3, wherein the compressed pictorial graphics represent song associated pictorial graphics; and wherein the memory further comprises instructions causing the processor, when no song is playing on the computer jukebox, to generate a user attract mode wherein song associated graphic images are shown on the display.

5. The computer jukebox of claim 1, wherein the communication interface is selected from the group consisting essentially of: modems, radio frequency transmitters and receivers, and direct communication interface ports, and wherein the data storage unit stores compressed song identity data as received by the communication interface.

6. The computer jukebox of claim 1, wherein the display is at least 14 inches in diagonal measure.

7. An improved computer jukebox network comprising: a plurality of computer jukeboxes where each computer jukebox is capable of playing songs selected by users of the computer jukebox from a library of songs that have been digitally compressed and stored in the computer jukebox and where the library of songs is capable of being updated upon the receipt of compressed digital song data, which represents at least one song, and upon the receipt of song identity data which represents the identity of each such song; and a management station for updating the library of songs in each of the plurality of computer jukeboxes; with each computer jukebox comprising:

a communication interface for receiving the compressed digital song data and the song identity data;

a data storage unit for storing the received compressed digital song data and the received song identity data for each of the songs stored;

a display for showing, to prospective user of the computer jukebox, information based on song identity data for identifying the songs for which digital song data is stored in the data storage unit;

selection keys responsive to a selection of a song to be played on the computer jukebox from the song identity information displayed on the display, the selection keys including a signal output representing activation of the selection keys;

at least one audio speaker;

a processor connected to a memory, the memory including a decompression algorithm for decompressing compressed digital song data;

10

a digital to analog converter coupled between the processor and the audio speaker to convert digital song data to an analog signal coupled to the speaker; and wherein the memory further includes instructions for:

causing the processor, in response to the signal output, to access and process compressed digital song data retrieved from the data storage unit so that the accessed compressed digital song data corresponds to the song selected by the selection keys;

causing the processor to decompress the accessed compressed digital song data and send the decompressed digital song data to the digital to analog converter so that the song selected is played on the computer jukebox as a result of the corresponding stored compressed digital song data being decompressed and converted by the processor and the digital to analog converter; and

causing the processor to respond to compressed digital song data and to song identity data, which may be received by the communication interface of the computer jukebox, to control the storage of the received compressed digital song data and the received song identity data in the data storage unit to create an updated library of songs stored in the computer jukebox; and

wherein the management station comprises:

a communication interface including a receiver and a transmitter; and

a management station processor connected to a management station memory, the management station memory including instructions for:

causing the management station processor to store digital song data, representing a set of songs, and song identity data, representing the identity of each song in the set of songs in a management station data storage unit;

causing the management station processor to compress digital song data stored in the management station data storage unit;

causing the management station processor to compress and transmit a subset of the digital song data and transmit corresponding song identity data to at least one selected computer jukebox to update the library of songs in the computer jukebox.

8. The jukebox network of claim 7 wherein the management station is remote from the computer jukeboxes; and wherein the communication interface of each computer jukebox is a bi-directional communication interface.

9. The jukebox network of claim 7 wherein the management station is portable; and wherein the communications interface of the management station and at least one computer jukebox is a direct communication link interface.

10. The jukebox network of claim 7, wherein the memory in each computer jukebox further comprises instructions causing the processor to respond to control the information shown on the display to include the updated library of songs.

11. The jukebox network of claim 7, wherein the memory in each computer jukebox further comprises instructions causing the processor to store song usage data generated upon the playing of a song, and wherein the communications interface includes a transmitter for transmitting song the song usage data under the control of the processor.

\* \* \* \* \*

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 6,397,189 B1  
DATED : May 28, 2002  
INVENTOR(S) : John R. Martin, Michael L. Tillery and Samuel N. Zammuto

Page 1 of 2

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 4,

Line 31, delete "now gong" and substitute therefor -- new song --.

Column 6,

Line 17, delete "spade" and substitute therefor -- space --.

Column 8,

Lines 34-37, delete "a display for showing, to prospective user of the computer jukebox, information identifying the songs for which digital song data is stored in the data storage unit and that is based on song identify data;" and substitute therefor -- a display adapted for showing, to prospective user of the computer jukebox, user attract data and information that identifies the songs for which digital song data is stored in the data storage unit and that is based on song identity data; --

Line 52, after "wherein the memory further includes instructions for:" please insert -- causing the processor to have the display show at least one of user attract data and information that identifies the songs for which digital song data is stored in the data storage; --

Column 9,

Line 12, delete "transmitting song the song" and substitute therefor -- transmitting the song --.

Line 51, delete "a display for showing, to prospective user of the computer jukebox, information based on song identity for identifying the songs for which digital song data is stored in the data storage unit;" and substitute therefor -- a display adapted for showing, to prospective user of the computer jukebox, user attract data and information based on song identity data for identifying the songs for which digital song data is stored in the data storage unit; --

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 6,397,189 B1  
DATED : May 28, 2002  
INVENTOR(S) : John R. Martin, Michael L. Tillery and Samuel N. Zammuto

Page 2 of 2

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 10,

Line 5, after "wherein the memory further includes instructions for:" please insert  
-- causing the processor to have the display show at least one of user attract data and  
information that identifies the songs for which digital song data is stored in the data  
storage; --

Signed and Sealed this

Twelfth Day of August, 2003

A handwritten signature in black ink, appearing to read "James E. Rogan", with a horizontal line drawn underneath it.

JAMES E. ROGAN  
*Director of the United States Patent and Trademark Office*



# **Exhibit H**



US006381575B1

(12) **United States Patent**  
**Martin et al.**

(10) **Patent No.:** **US 6,381,575 B1**  
 (45) **Date of Patent:** **\*Apr. 30, 2002**

(54) **COMPUTER JUKEBOX AND COMPUTER JUKEBOX MANAGEMENT SYSTEM**

- (75) Inventors: **John R. Martin; Michael L. Tillery,**  
 both of Rockford, IL (US)
- (73) Assignee: **Arachnid, Inc.,** Rockford, IL (US)
- (\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

- (21) Appl. No.: **09/502,875**  
 (22) Filed: **Feb. 11, 2000**

**Related U.S. Application Data**

- (63) Continuation of application No. 09/076,849, filed on May 12, 1998, which is a continuation of application No. 08/584,253, filed on Jan. 11, 1996, now Pat. No. 5,781,889, which is a continuation of application No. 08/268,782, filed on Jun. 30, 1994, now abandoned, which is a continuation of application No. 07/846,707, filed on Mar. 6, 1992, now Pat. No. 5,355,302.
- (51) Int. Cl.<sup>7</sup> ..... **G06F 17/60**  
 (52) U.S. Cl. .... **705/1; 705/26; 705/50; 705/51**  
 (58) Field of Search ..... **705/50, 51, 52, 705/59, 10, 21, 22**

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*Primary Examiner*—James P. Trammell

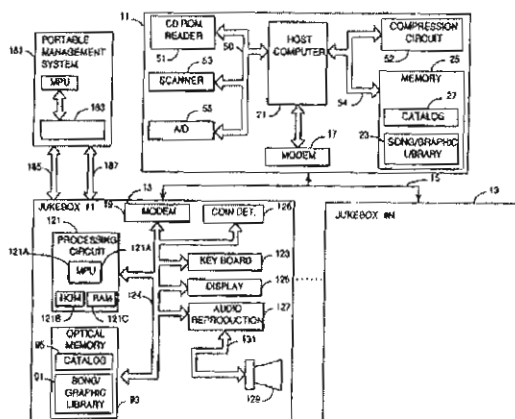
*Assistant Examiner*—Calvin L. Hewitt

(74) *Attorney, Agent, or Firm*—McAndrews, Held & Malloy, Ltd.

(57) **ABSTRACT**

A central management system manages a plurality of computer jukeboxes and communicates compressed digital data with each jukebox via a transmission link. The management system also includes a host computer that maintains a master set of compressed digital data representing a plurality of songs, song associated graphics, and song identity information. Each jukebox includes a storage unit that is capable of storing a subset of the master set and a processing circuit having a decompression circuit. The processing circuit controls the operation and flow of digital data into and out of the jukebox through the transmission link as well as a visual song information display, user song selection keys, a money detector, and an audio reproduction circuit coupled to a speaker system so as to provide audio output to users of the jukebox.

**27 Claims, 5 Drawing Sheets**



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Page 2

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U.S. Patent

Apr. 30, 2002

Sheet 1 of 5

US 6,381,575 B1

FIG. 1

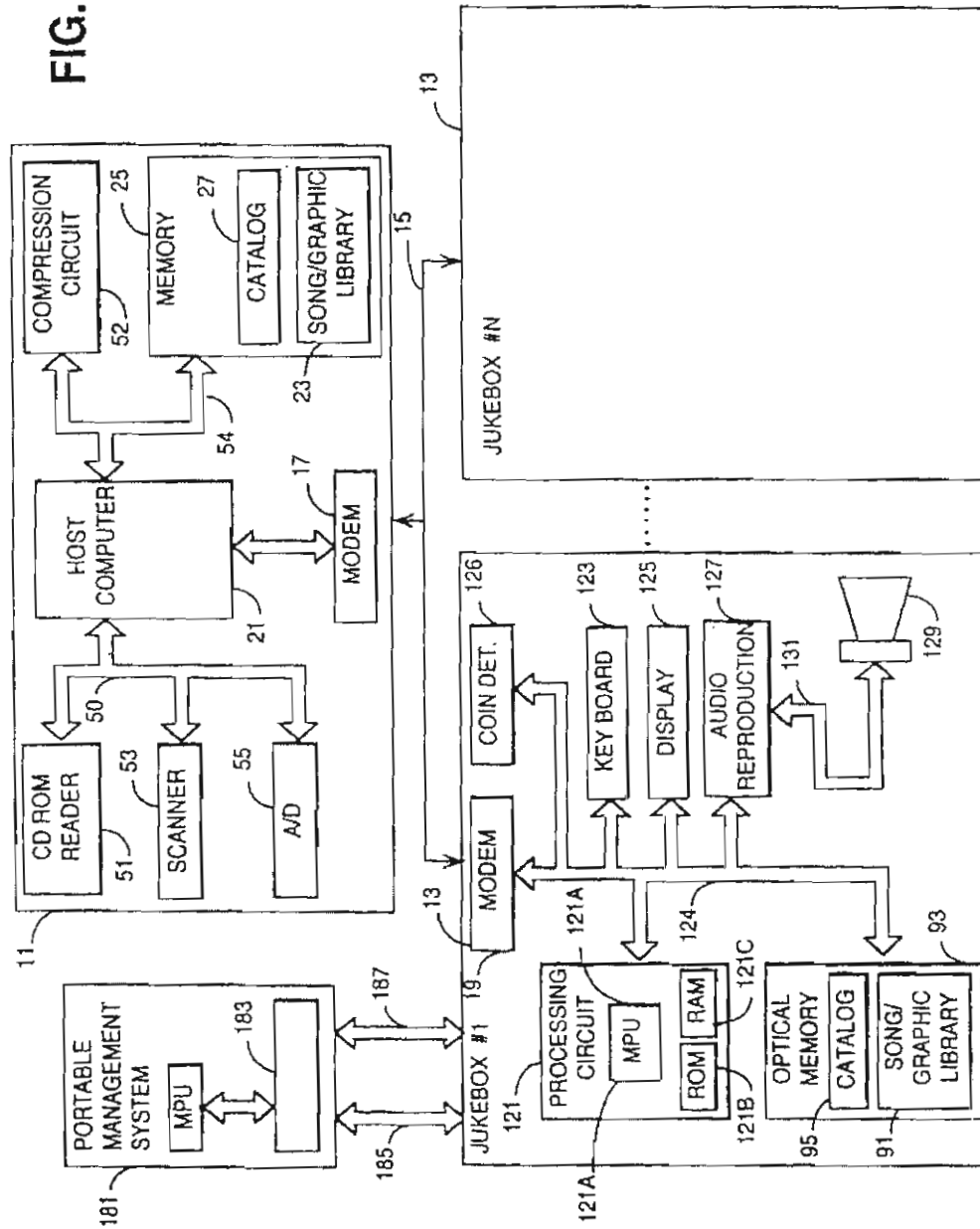
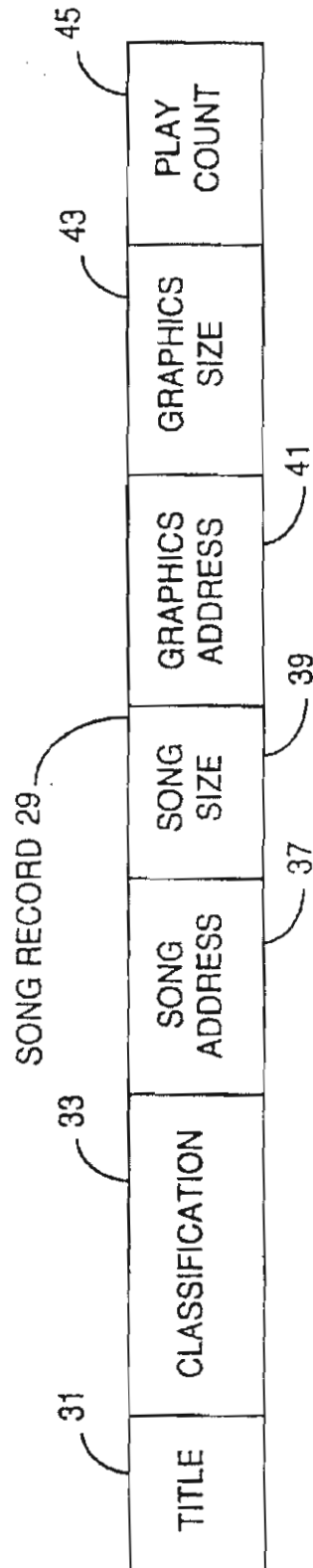




FIG. 2



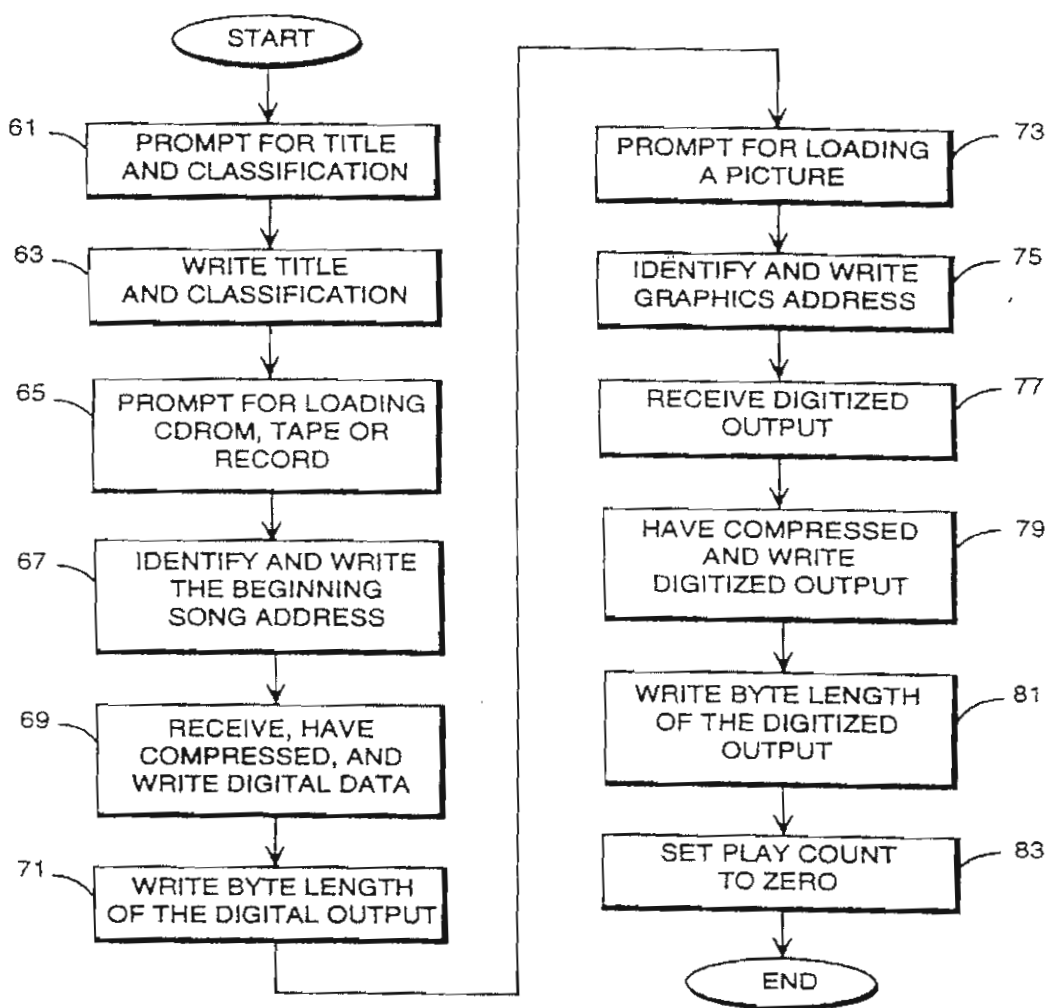
U.S. Patent

Apr. 30, 2002

Sheet 3 of 5

US 6,381,575 B1

FIG. 3



U.S. Patent

Apr. 30, 2002

Sheet 4 of 5

US 6,381,575 B1

FIG. 4A

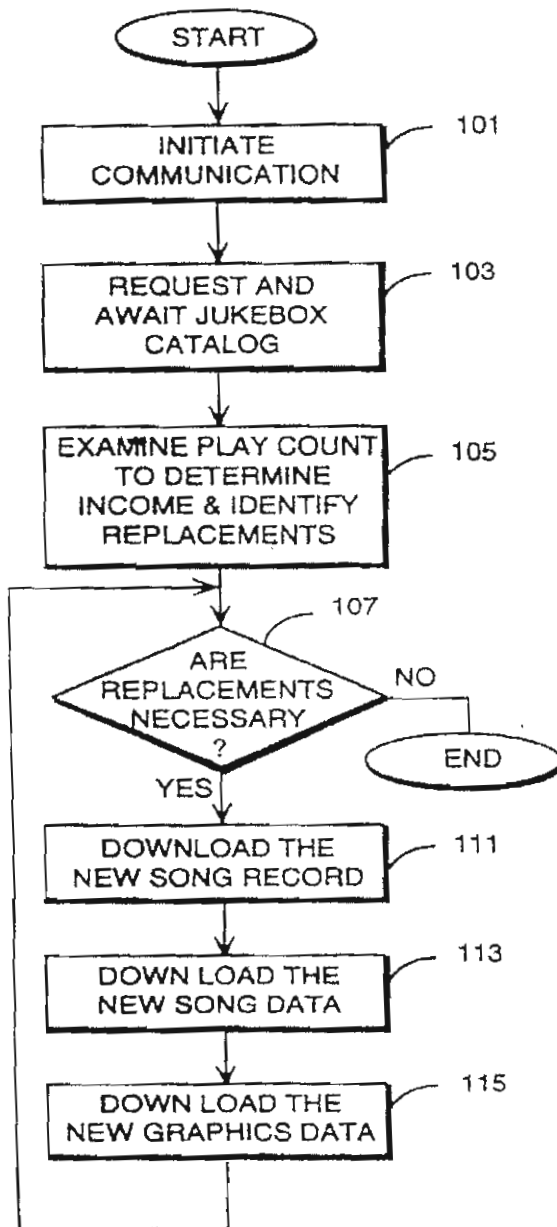
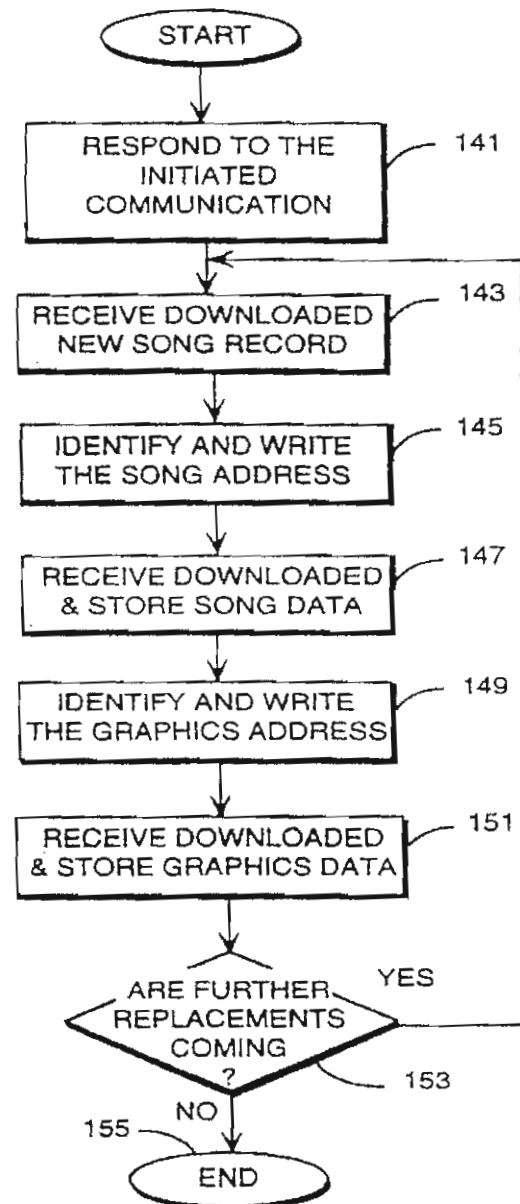


FIG. 4B



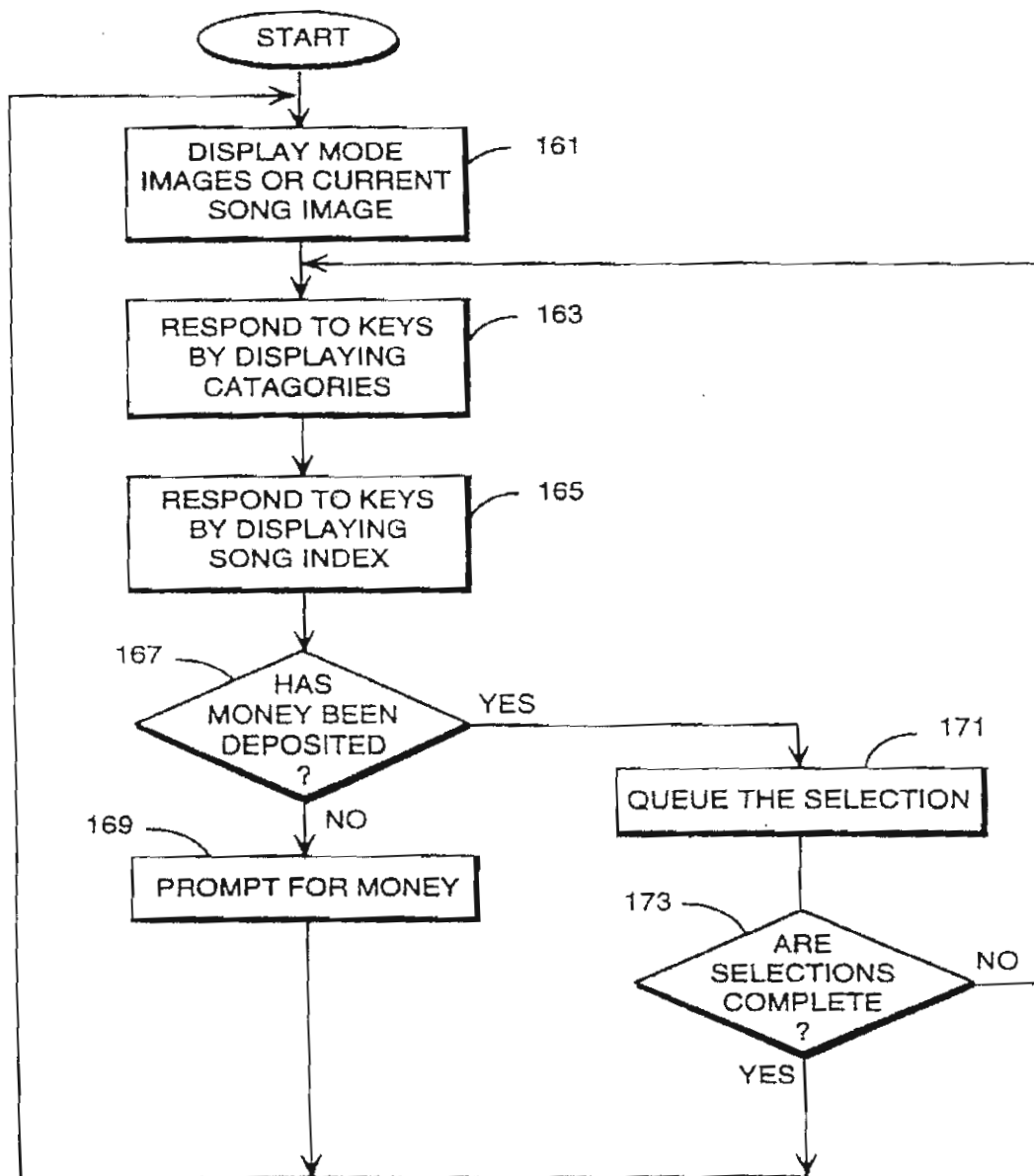
U.S. Patent

Apr. 30, 2002

Sheet 5 of 5

US 6,381,575 B1

FIG. 5





US 6,381,575 B1

1

## COMPUTER JUKEBOX AND COMPUTER JUKEBOX MANAGEMENT SYSTEM

### CROSS REFERENCE TO RELATED APPLICATIONS

This application is a Continuation of application Ser. No. 09/076,849, filed May 12, 1998 which is a Continuation of application Ser. No. 08/584,253, filed Jan. 11, 1996, now U.S. Pat. No. 5,781,889, which is a Continuation of application Ser. No. 08/268,782, filed Jun. 30, 1994, now abandoned, which is a Continuation of application Ser. No. 07/846,707, filed Mar. 6, 1992, now U.S. Pat. No. 5,355,302.

### FIELD OF THE INVENTION

The present invention relates generally to a jukebox system, and more particularly to such a system including one or more computer jukeboxes that can be managed from a remote location.

### BACKGROUND OF THE INVENTION

Heretofore, an assortment of musical recordings found in a jukebox consists of a plurality of records, each record containing a specific recording. Traditionally, these records are grooved phonograph records.

After a patron makes a selection, the selected phonograph record is mechanically removed from a storage rack within the jukebox, and the phonograph record is placed upon rotating platform. A stylus which is connected to a speaker system is then placed upon the rotating phonograph record, resulting in the phonograph record being played by the jukebox. For each selection, a separate phonograph record must be removed from the storage rack in order to be played by the jukebox.

Conventional jukeboxes have also implemented compact disks as means for creating an assortment of musical songs. Compact disks provide the improved sound quality made possible by digital recordings. The same technique, however, is used to play compact disks. A separate compact disk corresponding to each selection must be removed from a storage rack in order for the jukebox to play the selection.

Updating conventional jukeboxes is a costly and time consuming task. Routemen must periodically travel to each jukebox location and replace the existing recordings of each jukebox with up-to-date records. The existing recordings are no longer used by the jukebox once removed, thus making the conventional method wasteful.

Routemen must also travel to each jukebox location to keep a tally of the number of times each musical recording is selected in order to determine royalty fees. It is known to provide a jukebox with a counter that keeps track of the number of times each musical recording is selected, but routemen must still travel to each jukebox location to obtain this information. Such a process requires an excessive number of people to visit jukebox location periodically and visually read the information off the counter within each jukebox. Since the number of jukeboxes in operation is quite large, the employment of routemen to obtain such data involves a considerable expense. Furthermore, the ever changing nature of the recording industry requires that such data be gathered frequently in order to keep abreast of a continually changing market.

### OBJECTS AND SUMMARY OF THE INVENTION

Accordingly, it is a primary object of the present invention to provide a method and apparatus for managing a plurality

2

of computer jukeboxes which is capable of eliminating the necessity for routemen to change records in the jukeboxes. The computer jukeboxes store recordings in memory, thus enabling routemen to simply load new recordings into the memory of each computer jukebox.

Another object of the present invention is to eliminate a necessity for routemen by enabling new recordings and selection menus to be downloaded to each computer jukebox via a transmission link. In that regard, it is an object of the present invention to provide a method and apparatus which eliminates the material waste usually associated with updating jukeboxes. Instead of throwing away old recordings and replacing them with new ones, as is the conventional procedure, the present invention eliminates this waste by enabling new recordings to simply be downloaded into the memory of each computer jukebox. The old recordings are simply erased, if necessary.

Another object of the present invention is to provide a method and apparatus which is capable of remotely obtaining jukebox usage data, thus eliminating a necessity for routemen to do this task. The present invention utilizes a computer jukebox, which as part of its software programming, stores the number of times each musical recording is played and the number of credits that have been awarded. This data is uploaded to a central control device via a transmission link.

An additional object of the present invention is to provide a method and apparatus utilizing modem computer technology to digitally store and play musical records. The jukebox of the present invention is basically a computer having a sophisticated audio production capability, the computer storing digitized song data in a computer memory. Because conventional jukeboxes maintain compact discs or records in the jukebox, theft of the compact disc/records has been a problem, this problem being eliminated by the present invention's utilization of a computer memory to store the digitized song data.

A further object of the present invention is to provide a method and apparatus capable of being used with the remote management of jukeboxes via public telephone lines without interfering with establishments' use of their own phone lines.

Other objects, features and advantages of the present invention will be readily apparent from the following description of certain preferred embodiments thereof taken in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the disclosure.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of the computer jukebox system of the present invention;

FIG. 2 is an illustration of the data structure of an individual song record stored in a master library catalog illustrated in FIG. 1;

FIG. 3 is a flow-chart illustrating the procedure for storing new songs in a bulk storage unit illustrated in FIG. 1;

FIGS. 4A and B are flow-charts illustrating the software procedures used by the central management system and the jukebox respectively in managing the song library of the jukebox; and

FIG. 5 is a flow-chart illustrating the specific operation of the jukebox in interfacing with a user.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

In accordance with the present invention as shown in FIG. 1, a central management system 11 monitors and updates the

US 6,381,575 B1

3

available selection of music at a number of remotely located jukeboxes such as a jukebox 13. Particularly, the central management system 11 monitors each jukebox 13 to determine the number of times each song has been played. From these numbers, the central management system 11 can calculate the royalty payments that are due. More importantly, the central management system 11 can identify those specific songs which need to be replaced in each jukebox on an individual basis, the central management system communicating replacement songs to each jukebox 13 to update the available music selection therein as needed.

Each jukebox 13 is basically a computer having sophisticated audio production capability wherein each computer jukebox 13 is programmed to play songs that have been digitally compressed and stored in a large-volume data storage unit 93. The storage unit 93 may be an optical memory or any other available large volume nonvolatile computer memory that provides both read and write access.

The central management system 11 communicates with each computer jukebox 13 via a transmission link 15. The central management system 11 and each jukebox 13 use respective modems 17 and 19 to maintain serial communication on the transmission link 15. The transmission link 15 may be a cable system such as public or private telephone lines or the like. However, the modems 17 and 19 may be replaced with RF (radio frequency) transceivers and associated antennas. In the latter instance the transmission link 15 is an RF link.

Specifically, the central management system 11 includes a host computer 21 which maintains a master library 23 of songs and associated graphics which are stored in a compressed digital form in a bulk storage unit 25. The bulk storage unit 25 is capable of storing vast amounts of digital data, and may be take the form of a read-write optical storage device. The host computer 21 indexes the master library 23 by using a master catalog 27 which is also maintained in the bulk storage unit 25.

The master catalog 27 stores a song record 29, as illustrated in FIG. 2, for each song stored in the master library 23. Each song record 29 associates information in the following fields: a) a title field 31, containing the name of the song; b) a classification field 33, containing the type of music, i.e., country, pop, jazz, classical, etc.; c) a song address field 37, containing the beginning address in the bulk storage unit 25 of the compressed digital data of the song; d) a song size field 39, containing the number of bytes in length of the compressed digital data; e) a graphics address field 41, containing the beginning address in the bulk storage unit 25 of the compressed digital data of a graphics image, if any, to be associated with the song; f) a graphics size field 43, containing the number of bytes in length of the compressed graphics image; and g) a play count field 45, containing a count which indicates the number of times this specific song has been played. By parsing the master catalog 27, the host computer 21 can quickly locate all available information relating to any available song. The master catalog 27 also stores data particular to each jukebox such as the number of times each available song has been played, the coin intake for that jukebox, etc. The data particular to each jukebox is uploaded from the jukebox to the central management system 11 to update the master catalog 27.

Returning to FIG. 1, in order to add to the master library 23 and associated master catalog 27, the host computer 21 receives, has compressed and stores in the bulk storage unit 25 digital data representing the new song and associated pictorial graphics. The host computer 21 receives the digital

4

data for storage from three sources: 1) a compact disc read only memory (CDROM) reader 51, which reads CDROMs; 2) a graphics scanner 53, which digitizes pictorial graphic images; and 3) an analog to digital (A/D) reader/converter 55, which reads analog data from both tapes and records and then converts the analog data into digital data. A compression circuit 52 using an adaptive-delta, pulse-code-modulation compression scheme compresses the digital data before it is stored. Other compression schemes may also be used. The compression circuit 52 might also be fully replaced by a software algorithm which is executed by the host computer 21.

FIG. 3 more specifically illustrates the operation of the host computer 21 in adding new songs to the master library 23. At a block 61, the user is initially prompted by the host computer 21 to enter a new song title and category. The host computer 21 writes this information into the title field 31 and classification field 33 of a new song record 29 at a block 63. Next, at a block 65, the host computer 21 prompts the user to place either a CDROM into the reader 51 or a record or tape into the reader/converter 55. After the user has completed this placement, at a block 67 the host computer 21 identifies available storage space in the bulk storage unit 25 by analyzing the space in use as described in the current list of song records 29 in the master catalog 27. The beginning address of this available storage space is placed in the song address field 37 of the new song record 29. Thereafter, at a block 69, the host computer 21 provides a read enable signal on a bus 50 to either the reader 51 or reader/converter 55. Either the reader 51 or reader/converter 55 responds by reading and sending digital data representing the new song to the host computer 21 via the bus 50. Utilizing a bus 54, the host computer 21 forwards the digital data received to the compression circuit 52, receives compressed digital data from the compression circuit 52 and writes the compressed digital data into the bulk storage unit 25. At a block 71, upon reaching the end of the digital data output, i.e., the end of a song, the host computer 21 writes the byte length of the digital output into the song size field 39.

The host computer 21 at a block 73 prompts the user to load a picture, such as an album cover, into the graphics scanner 53. At a block 75, the host computer 21 identifies further available storage space in the bulk storage unit 25 and places the beginning address thereof into the graphics address field 41. Once a picture is loaded, the host computer 21 at block 77, using the bus 50, provides a read enable signal to the scanner 53 which responds via bus 50 by digitizing the picture and transferring the digitized output to the host computer 21. At a block 79, using the bus 54, the host computer 21 forwards the digitized data of the picture to the compression circuit 52, receives compressed digitized data from the compression circuit 52, and writes the compressed digitized data into the bulk storage unit 25. At a block 81, upon reaching the end of the digitized output, i.e., the end of the picture, the host computer 21 places the byte length of the digitized output into the graphics size field 43. Finally, at a block 83, the host computer 21 sets the play count field 45 to zero (0). This flow-chart is repeated as necessary until all of the new songs are added to the master library 23. It is noted that the operator can also delete, modify or replace any specific song record 29 found in the master catalog 27 and master library 23.

Returning to FIG. 1, each computer jukebox 13 plays songs and displays graphics which are stored locally in the large-volume data storage unit 93. The storage unit 93 of the jukebox 13 contains a subset of the songs found in the master library 23 maintained by the central management



US 6,381,575 B1

5

system 11. More specifically, the storage unit 93 of the jukebox 13 stores a song library 91 which is a corresponding subset of the master library 23. The song library 91 contains all of the currently available song selections and associated pictorial graphics for the jukebox 13. The storage unit 93 also stores a catalog 95 that is an index into the local song library 91. The catalog 95 is similar to the master catalog 27. Both the song library 91 and associated catalog 95 are monitored and updated by the central management system 11 as needed via the transmission link 15. The jukebox 13 permits this monitoring and updating at any time with no impact on its end-user performance.

The jukebox 13 also includes a processing circuit 121 which contains a microprocessor 121A, read only memory (ROM) 121B and random access memory (RAM) 121C. As in conventional computer systems, the microprocessor 121A operates in accordance with the software program contained in the ROM 121B and utilizes the RAM 121C for scratch-pad memory. The processing circuit 121 may also contain a decompression circuit (not shown) or may perform decompression using a software algorithm stored in the ROM 121B depending on the type of data compression scheme used by the central management system 11. In either case, decompression is necessary to decompress the compressed data received from the central control system 11 so that the song can be played and associated graphics image displayed.

The processing circuit 121 controls the operation and flow of data into and out of the jukebox 13 through the modem 19 via a bus 124. Using the bus 124, the processing circuit 121 also controls a visual display 125, one or more selection keys 123 and a coin/bill detector 126 to provide the user with an interactive interface to the jukebox 13. The keys 123 provide signals representing user inputs such as displayed song selection. The display 125 displays alpha numeric information as well as pictorial graphics to interface with the user. The coin/bill detector 126 is responsive to one or more coins or bills input by a customer to determine whether the proper amount of money has been input and to provide money detect signals coupled to the processing circuit. The processing circuit 121 further controls, via the bus 124, an audio reproduction circuit 127 coupled to a speaker system 129 along a bus 131 to provide an audio output to the user.

FIGS. 4A and 4B are flow-charts illustrating the software procedures respectively used by the central management system 11 and the jukebox 13 in managing the song library 91 of the jukebox 13. At a block 101, the central management system 11 initiates communication with one of the jukeboxes 13 via the transmission link 15. Immediately thereafter, at a block 103, the management system 11 requests that the jukebox data be sent including a copy of the catalog 95. At a corresponding block 141, the jukebox 13 responds by sending the copy of the catalog file as well as other jukebox data including total money intake over a period of time. The data sent from the jukebox to the management station may also include customer requests for new songs, a customer utilizing the display and keyboard of the jukebox 13 to enter song request data as discussed below. Thereafter, at a block 105, by examining each play count field 45 in the copy of the catalog 95 received, the management system 11 determines the royalty amount due per song and whether to replace or update specific song entries stored in the jukebox 13. The management system 11 also determines the total money intake from the play count information and compares this value to the total money intake value received from the jukebox to provide a check. At an inquiry block 107, if no replacements are necessary, the management system 11 branches to a block 109 to terminate

6

communication with the jukebox 13. If however, replacements are necessary, the management system 11 branches to download the changes. Particularly, at a block 111, the management system 11 downloads to the jukebox 13 the song records 29 of both the song to be replaced and the replacement song. In a corresponding block 143, the jukebox 13 replaces the song record 29 in the catalog 95. Thereafter, the jukebox 13 identifies available storage space in the storage unit 93 based on the song size field 39 of the new song, and writes the beginning address thereof into the song address field 37 in a corresponding block 145. Afterwards, at a block 113, the central management system 11 downloads the compressed digital data of the song to the jukebox 13. At a corresponding block 147, the jukebox 13 receives and writes the data into the song library 91. Next, at a corresponding block 149, the jukebox 13 identifies available storage space in the storage unit 93 based on the graphics size field 43, and writes the beginning address thereof into the graphics address field 41 of the new song. Thereafter, at a block 115, the management system 11 downloads the compressed digitized data of the picture to the jukebox 13. The jukebox, at a corresponding block 151, receives and writes the data into the song library 91. Finally, the block 107 is again encountered. If further replacements need to be made, the blocks 111, 113 and 115 are repeated until complete. At a corresponding block 153, the jukebox similarly repeats the corresponding blocks 143 through 151 until no further replacements need to be made. A further block placed immediately above the block 107 may also be used, wherein the central management system 11 sends a delete, modify, add or replace command to the jukebox 13 before downloading into the song library 93. In this way, the management system 11 receives additional flexibility in updating the jukebox 13. It is noted that the jukebox 13 can also initiate communications with the management system 11 at predetermined times or if the jukebox determines that an event has occurred that the management system 11 should be aware of.

FIG. 5 is a flow-chart illustrating the specific operation of the processing circuit 121 of the jukebox 13 in interfacing with the user. At a block 161, if no song selection is playing, the processing circuit 121 operates in a user attract mode, displaying a random sequence of available graphic images on the visual display 125. More particularly, the processing circuit 121 randomly selects a starting address of the compressed graphics data from the available song records 29 in the catalog 95. From that starting address, the circuit 121 retrieves the data from the song library 91 via the bus 124. The circuit 121 decompresses and transfers the data along the bus 124 to the visual display 125 for display. Thereafter, the circuit 121 again randomly selects a starting address of available graphics data and this cycle repeats. If, however, a song selection is being played when the block 161 is encountered, the attract mode sequencing does not occur. Instead, the circuit 121 displays the associated graphics image of the song being played on the display 125. During the attract mode the processing circuit 121 may also control the display 125 to present a prompt requesting customers to enter new song requests. The new song request data entered by a customer using the keyboard is stored and uploaded to the management system 11 to aid the system 11 in determining whether new song data should be downloaded to the jukebox.

At a block 163, the processing circuit 121 responds to a signal indicating user interest from the selection keys 123 by providing on the display 125 those music categories, i.e., country, rock, jazz, etc., found in the catalog 95. At a block

US 6,381,575 B1

7

165, the circuit 121 responds to a signal indicating a category selection from the keys 123 by providing on the display 125 an index of available songs, arranged alphabetically either by artist or title, which can be scrolled and selected using the keys 123. Upon selection of a specific song, the circuit 121 encounters an inquiry block 167. If at the block 167 the circuit 121 determines from the signal received from the money detector 125 that a sufficient amount of money has not been deposited, a branch to a block 169 occurs. At the block 169, using the display 125, the circuit 121 prompts the user to deposit money into the coin/bill detector 126, then branches back to the block 161. However, if sufficient moneys have been deposited, the circuit 121 branches to a block 171 wherein the circuit 121 updates the play count field of the selected song's record in the catalog file 95 and money intake data stored in the memory. The circuit also places the song record 29 corresponding to the selected song into a queue of song records to be played. After the selection is queued, the circuit 121 encounters an inquiry block 153. If the total number of selections purchased have been selected, the circuit 121 branches back to the block 161. Otherwise, if further purchased selections are forthcoming, the circuit 121 branches back to the block 163. In this manner, all of the selections are made and placed in the queue. Upon completion of playing a queued-up, selected song, the circuit 121 removes the corresponding song record 29 from the queue, selects the next song record in the queue, begins to play that next song, and executes the block 161. It is noted that the song queue can be displayed on the display 125 in order to show customers what songs have already been selected prior to making their selection.

More specifically, referring back to FIG. 1, once a specific song has been selected and queued-up, the processing circuit 121 first identifies the beginning address of the compressed digital data from the song address field 37 of the song record 29 in the queue. From this address, using the bus 124, the circuit 121 reads the compressed digital data out of the storage unit 93, decompresses that data, and sends the decompressed digital data to the audio reproduction circuit 127. The audio reproduction circuit 127, commonly found in CDROM readers and associated amplifiers, converts the digital data to an analog signal which is amplified and used to drive the speaker system 129 via the bus 131. After a selected song finishes playing, the processing circuit 121 deletes the song record 29 of the selected song from the queue, increments the play count field 45 associated with that song in the catalog 95, and begins playing the next selected song in the queue if any exists. The process set forth in the flow-chart detailed in FIG. 5 is then repeated.

While the present invention is being described and illustrated in accordance with the preferred embodiment enabling new recordings and computer usage data to be transferred via the transmission line 15, the monitoring and updating may also be directly transferred. In this latter embodiment, routemen physically visit the location of each computer jukebox 13. During these visits, the routemen carry a portable management system 181 which has only a subset of potential replacement songs stored in a subset library and associated catalog (not shown) on a portable bulk storage unit 183. The subset library is loaded by the portable management system 181 onto the portable bulk storage unit 183 either directly from the bulk storage unit 25 or indirectly as is initially done by the central management system 11 (described above). In all other ways, the portable management system 181 operates the same as the central management system 11, collecting the catalog 95 of each jukebox 13

8

and updating or replacing as necessary. To accomplish this, the portable management system 181 communicates at a very high rate of speed with the jukebox 13 via a parallel communication link 185 and a direct memory access (DMA) link 187.

Additionally, the routemen may simply exchange the "old" storage unit 93 with a pre-loaded storage unit (not shown). The central management system 11 may later read the "old" storage unit 93 to gather the information from the catalog 95. Such an embodiment still enjoys the other advantages made possible by the computer jukeboxes 13 described herein.

Additionally, it is to be understood that the embodiments of the present invention described hereinabove are merely illustrative and that other modifications and adaptations may be made without departing from the scope of the appended claims.

We claim:

1. A computer jukebox for playing songs transferred to and stored in the computer jukebox, the computer jukebox comprising:

at least one communication interface for receiving digitized song data and for receiving an associated song record, the song record including song identity data comprising at least one of a song title, a song category, song address, song size, graphics address, graphics size, and play count;

a memory storing the digitized song data and the song identity data;

a display presenting song selections based on the song identity data;

a song selector for determining from the song selections a selected digitized song to be played on the computer jukebox;

at least one audio speaker;

a processor operative to retrieve digitized song data corresponding to the selected digitized song, and operative to store the digitized song data and the song identity data received by the at least one communication interface in the memory; and

a digital to analog converter coupled between the processor and the audio speaker to convert the digitized song data to an analog signal for the audio speaker.

2. A computer jukebox according to claim 1, wherein the memory stores the digitized song data in a digitized song library and stores the song identity data in a song catalog.

3. A computer jukebox according to claim 1, wherein the display presents available song selections according to at least two of song genre, song artist and song title associated with each digitized song.

4. A computer jukebox according to claim 1, wherein the display presents the song selections with associated graphics identified by the graphics address, the song selections arranged alphabetically according to at least one of a song artist and the song title associated with each digitized song.

5. A computer jukebox according to claim 2, wherein the processor is responsive to the song selector for scrolling the song selections on the display.

6. A computer jukebox according to claim 4, wherein the processor is operable to display a user attract mode that shows graphics identified by the graphics address when no digitized song is playing.

7. A computer jukebox according to claim 1, wherein the processor is further operative to create at least one play count for a digitized song and to create associated money intake data for the digitized song.



US 6,381,575 B1

9

8. A computer jukebox according to claim 7, wherein the processor is further operative to transfer the associated money intake data and the play count through the at least one communication interface to a remote location for accounting.

9. A central management system for distributing digitized songs to a computer jukebox, the central management system comprising:

at least one communication interface for transmitting digitized song data and for transmitting an associated song record, the song record including song identity data comprising at least one of a song title, a song category, song address, song size, graphics address, graphics size, and play count;

a memory storing digitized song data and song identity data; and

a processor operative to retrieve selected digitized song data and transmit the selected digitized song data to a computer jukebox through the at least one communication interface, the processor further operative to retrieve song identity data associated with the selected digitized song data, build an associated song record using the song identity data, and transmit the associated song record to the computer jukebox through the at least one communication interface.

10. The central management system of claim 9, wherein the memory stores digitized song data in a digitized song library and stores the song identity data in a song catalog.

11. The central management system of claim 9, wherein the song identity data includes the graphics address identifying a graphic associated with a digitized song, and wherein the processor is further operative to transmit the digitized graphic over the at least one communication interface to the computer jukebox.

12. The central management system of claim 10, wherein the processor is further operative to receive from a computer jukebox and store a digitized song play count and associated money intake data for the digitized song.

13. The central management system of claim 12, wherein the processor is further operative to determine royalties based on the associated money intake data.

14. The central management system of claim 10, wherein the processor is further operative to receive from the computer jukebox and store a digitized song play count, determine whether to replace a digitized song associated with the digitized song play count in the computer jukebox, and transmit replacement digitized song data and a replacement song record to the computer jukebox.

15. A computer jukebox network, comprising:

a central management system for distributing digitized songs stored in a digitized song library to a computer jukebox, the central management system comprising: at least one system communication interface for transmitting digitized song data and for transmitting an associated song record, the song record including song identity data comprising at least one of a song title, a song category, song address, song size, graphics address, graphics size, and play count;

a system memory storing digitized song data and song identity data; and

a system processor operative to retrieve selected digitized song data and transmit the selected digitized song data to a computer jukebox through the at least one communication interface, the processor further operative to retrieve song identity data associated with the selected digitized song data, build an associated song record using the song identity data, and

10

transmit the associated song record to the computer jukebox through the at least one communication interface; and

a plurality of computer jukeboxes for playing songs stored in a memory in the computer jukebox, at least one computer jukebox comprising:

at least one jukebox communication interface for receiving digitized song data and for receiving an associated song record, the song record including song identity data comprising at least one of a song title, a song category, song address, song size, graphics address, graphics size, and play count;

a jukebox memory storing the digitized song data and the song identity data;

a display presenting song selections based on the song identity data;

a song selector for determining from the song selections a selected digitized song to be played on the computer jukebox;

at least one audio speaker;

a processor operative to retrieve digitized song data corresponding to the selected digitized song, and operative to store the digitized song data and the song identity data received by the at least one communication interface in the memory; and

a digital to analog converter coupled between the processor and the audio speaker to convert the digitized song data to an analog signal for the audio speaker.

16. The computer jukebox network of claim 15, wherein the system processor is further operative to receive from the computer jukebox and store a digitized song play count, determine whether to replace a digitized song associated with the digitized song play count in the computer jukebox, and transmit replacement digitized song data and a replacement song record to the computer jukebox.

17. The computer jukebox network of claim 15, wherein the jukebox processor is further operative to create at least one play count for a digitized song and to create associated money intake data for the digitized song.

18. The computer jukebox network of claim 17, wherein the jukebox processor is further operative to transfer the associated money intake data and the play count through the at least one jukebox communication interface to a remote location for accounting.

19. The computer jukebox network of claim 15, wherein the processor is further operative to receive from a computer jukebox and store a digitized song play count and associated money intake data.

20. The computer jukebox network of claim 19, wherein the processor is further operative to determine royalties based on the associated money intake data.

21. The computer jukebox network of claim 15, wherein the display presents the song selections with associated graphics identified by the graphics address, the song selections arranged alphabetically according to at least one of a song artist and the song title associated with each digitized song.

22. A method for receiving and playing songs using a computer jukebox, the method comprising:

receiving at the computer jukebox digitized song data and an associated song record, the song record including song identity data comprising at least one of a song title, a song category, song address, song size, graphics address, graphics size, and play count;

storing the digitized song data and the song identity data in a memory in the computer jukebox;



US 6,381,575 B1

11

presenting song selections based on the song identity data on a display;

determining from the song selections a selected digitized song to be played on the computer jukebox based on input from a song selector;

retrieving digitized song data corresponding to the selected digitized song;

converting the digitized song data to an analog signal; and applying the analog signal to an audio speaker.

23. The method of claim 22, wherein the step of storing further comprises storing the digitized song data in a digitized song library and storing the song identity data in a song catalog.

24. A computer jukebox according to claim 22, wherein the step of presenting further comprises presenting available song selections according to at least two of song genre, song artist and song title associated with each digitized song.

12

25. The method of claim 22, wherein the step of presenting further comprises presenting the song selections with associated graphics identified by the graphics address, the song selections arranged alphabetically according to at least one of a song artist and the song title associated with each digitized song.

26. The method of claim 22, further comprising the step of creating at least one play count for a digitized song and creating associated money intake data for the digitized song.

27. The method of claim 22, further comprising the step of replacing a digitized song in the computer jukebox based on the digitized song play count by receiving and storing in the memory the replacement digitized song data and a replacement song record.

\* \* \* \* \*

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 6,381,575 B1  
DATED : April 30, 2002  
INVENTOR(S) : John R. Martin and Michael L. Tillery

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 11.

Line 1, delete "presenting song selections based on the song identity data on a display;" and substitute therefor -- presenting at least one of a user attract mode and song selections based on the song identity data on a display; --

Signed and Sealed this

Thirteenth Day of January, 2004

A handwritten signature in black ink, appearing to read "Jon W. Dudas". The signature is stylized with a large, looped initial "J" and a distinct "D" at the end.

JON W. DUDAS  
*Acting Director of the United States Patent and Trademark Office*

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 6,381,575 B1  
DATED : April 30, 2002  
INVENTOR(S) : John R. Martin and Michael L. Tillery

Page 1 of 2

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 8,

Line 31, delete "a display presenting song selections based on the song identity data;" and substitute therefor -- a display adapted for presenting song selections based on the song identity data and a user attract mode; --

Line 37, delete "a processor operative to retrieve digitized song data corresponding to the selected digitized song, and operative to store the digitized song data and the song identity data received by the at least one communication interface in the memory;" and substitute therefor -- a processor operative to present on the display at least one of a user attract mode and song selections based on song identity data, and operative to retrieve digitized song data corresponding to the selected digitized song, and operative to store the digitized song data and the song identity data received by the at least one communication interface in the memory; --

Column 9,

Line 6, delete "at least one communication interface for transmitting digitized song data and for transmitting an associated song record, the song record including song identity data comprising at least one of a song title, a song category, song address, song size, graphics address, graphics size, and play count;" and substitute therefor -- at least one communication interface adapted for transmitting user attract data, for transmitting digitized song data and for transmitting an associated song record, the song record including song identity data comprising at least one of a song title, a song category, song address, song size, graphics address, graphics size, and play count; --

Line 15, delete "a memory storing digitized song data and song identity data;" and substitute therefor -- a memory storing digitized song data and song identity data and adapted for storing user attract data; --

Column 10,

Line 15, delete "a display presenting song selections based on the song identity data;" and substitute therefor -- a display adapted for presenting song selections based on the song identity data and a user attract mode; --

Line 21, delete "a processor operative to retrieve digitized song data corresponding to the selected digitized song, and operative to store the digitized song data and the song identity data received by the at least one communication interface in the memory;" and substitute therefor -- a processor operative to present on the display at least one of a user attract mode and song selections based on song identity data, operative to retrieve digitized song data corresponding to the selected digitized song, and operative to store the digitized song data, and the song identity data received by the at least one communication interface in the memory; --

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 6,381,575 B1  
DATED : April 30, 2002  
INVENTOR(S) : John R. Martin and Michael L. Tillery

Page 2 of 2

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 11.

Line 1, delete "presenting song selections based on the song identity data on a display;" and substitute therefor -- presenting at least one of a user attract mode and song selections based on the song identity data on a display; --

This certificate supersedes Certificate of Correction issued January 13, 2004.

Signed and Sealed this

Third Day of February, 2004

A handwritten signature in black ink, appearing to read "Jon W. Dudas". The signature is stylized with a large, looped initial "J" and a distinct "D" at the end.

JON W. DUDAS  
*Acting Director of the United States Patent and Trademark Office*



# **Exhibit I**



US006191780B1

(12) **United States Patent**  
**Martin et al.**

(10) **Patent No.:** **US 6,191,780 B1**  
(45) **Date of Patent:** **Feb. 20, 2001**

(54) **CUSTOMIZABLE MULTIMEDIA SEGMENT STRUCTURES**

WO 97/09708 3/1997 (WO).

#### OTHER PUBLICATIONS

(75) Inventors: **John R. Martin**, Rockford, IL (US);  
**Charles D. Rentmeesters**, Madison, WI (US)

Wall, et al., "An Overview of Perl," XP-002126585 O'Reilly & Associates (1996).

(73) Assignee: **Arachnid, Inc.**, Rockford, IL (US)

Bulterman, Dick C. A. "Embedded Video in Hypermedia Documents: Supporting Integration and Adaptive Control." ACM Transactions on Information Systems, vol. 13, No. 4, Association for Computing Machinery. ©1995. pp. 440-470.\*

(\*) Notice: Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.

Printout of Java™ code for "connect4" applet. Found online at <http://javaboutique.internet.com>. Upload date Dec. 1, 1996.\*

(21) Appl. No.: **09/047,653**

\* cited by examiner

(22) Filed: **Mar. 25, 1998**

(51) Int. Cl.<sup>7</sup> ..... **G06F 17/00**

*Primary Examiner*—Joseph H. Feild

(52) U.S. Cl. .... **345/302; 707/104; 705/15; 705/27**

*Assistant Examiner*—Michael J. Perkins

(58) Field of Search ..... **707/104; 345/302; 705/15, 27**

(74) *Attorney, Agent, or Firm*—McAndrews, Held & Malloy, Ltd.

#### (57) **ABSTRACT**

#### (56) **References Cited**

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An electronic devices executes from memory an advertising multimedia segment structure that includes a command segment storing multimedia commands that in turn invoke multimedia effects and that is supported by a definition segment that invokes the command segment. The definition segment also includes argument definitions for the tokenized arguments in the command segment. The command segments are protected against alteration by encryption, while the definition segments are alterable to provide locally customized advertisements in accordance with the tokenized arguments in the command segments. A library of downloadable command segments provides predefined advertisements, displays, and the like for the electronic device.

12 Claims, 1 Drawing Sheet

200 ↗

Example MAC file: "template.mac"

202 ↘ SETCOLOR 254  
CIRCLE 1 100 50 540 430  
LINE 540 50 100 430  
  
SETFONT 2  
SETTEXTBOX 0 0 100 100 540 150  
TEXT ^TEST^

204 ↘ Example DAT file: "ad1.dat"

TEMPLATE = C:\template.mac  
TEST= "This is a test message."

U.S. Patent

Feb. 20, 2001

US 6,191,780 B1

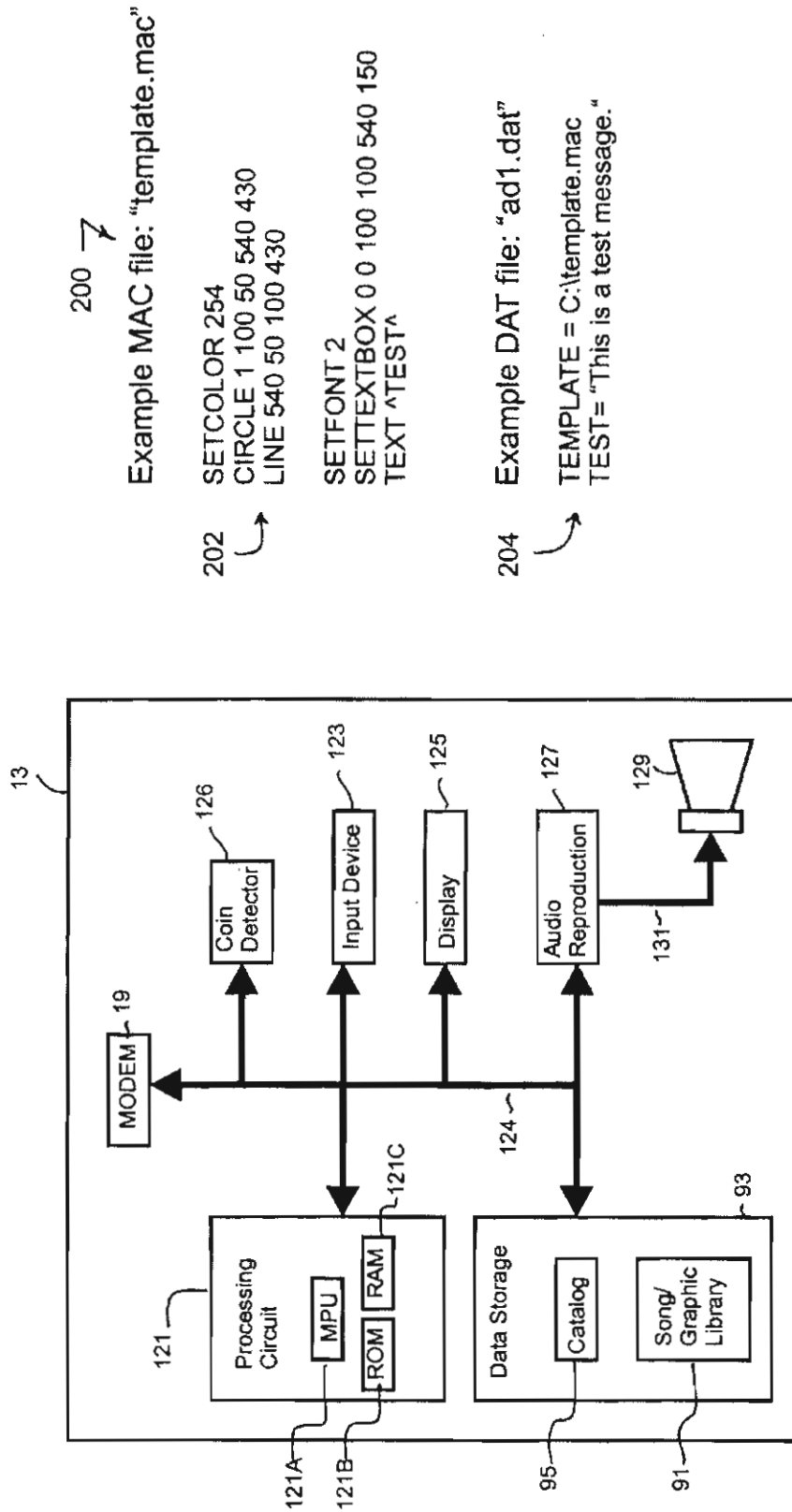


Figure 1

200 →  
Example MAC file: "template.mac"

202 →  
SETCOLOR 254  
CIRCLE 1 100 50 540 430  
LINE 540 50 100 430  
SETFONT 2  
SETTEXTBOX 0 0 100 100 540 150  
TEXT ^TEST^

204 →  
Example DAT file: "ad1.dat"  
TEMPLATE = C:\template.mac  
TEST= "This is a test message."

Figure 2

US 6,191,780 B1

1

## CUSTOMIZABLE MULTIMEDIA SEGMENT STRUCTURES

### BACKGROUND OF THE INVENTION

The present invention relates generally to a segment structure which allows electronic devices to generate multimedia displays. In particular, the invention relates to a segment structure that allows customization of selected portions of the multimedia displays while maintaining the integrity of other selected portions of the multimedia displays.

Computer jukeboxes and electronic dart games (using dart boards interfaced with a controller) generally fall into the category of electronic amusement devices. Examples of such devices are disclosed in U.S. Pat. Nos. 5,355,302 to Martin et al., 5,114,155 to Tillery et al., and 5,401,033 to Lychock, Jr which are incorporated herein by reference in their entirety. Electronic amusement devices typically make their way from a manufacturer to a distributor then to a route operator who installs the electronic amusement devices in establishments including hotels, bars, casinos.

As electronic devices, including electronic amusement devices, have become more sophisticated, they have incorporated hardware to produce audio, visual, or other effects. Any electronic device including even rudimentary audio, video, or other effects may be used to communicate information, for example, advertisements, via multimedia presentations. Thus, a computer jukebox or an electronic dart game may include audio or visual hardware to produce effects used in an advertisement. Such electronic amusement devices have also become capable of providing another source of income by displaying multimedia displays of advertisements programmed to run when certain multimedia capabilities of the electronic device are available.

As an example, computer jukeboxes provide a selection menu allowing a patron to select a particular song that he or she may want to hear. However, when a patron is not selecting a song, an advertisement (which may or may not generate revenue) may be displayed on a screen attached to the computer jukebox, and/or played through speakers attached to the computer jukebox.

Even if an advertisement is displayed, there is no guarantee that it will provide a suitable match to a local business. As an example, a predefined pizza advertisement generally would not match the particular names, addresses, or phone numbers of pizza establishments in a particular locality. The diverse types of local business in the communities in which electronic devices are installed leads directly to diverse requirements for the advertisements displayed on the electronic devices.

It is also desirable, in some instances, to prevent a predefined advertisement from being modified in whole or in part. For example, advertisers that expend a great deal of money to develop national-based advertisements typically may require assurances that the advertisement will not be modified when displayed on an electronic device. In other instances, only a portion of the advertisement (for example, the text or graphics generally, or the text or graphics displayed at particular times or places in the advertisement) may need protection from customization.

A need exists for a mechanism by which customized or non-customized advertisements may be displayed on electronic devices installed in diverse establishments.

### BRIEF SUMMARY OF THE INVENTION

It is an object of the present invention to provide segment structures that enable route operators or other intermediate

2

distribution personnel to produce customized multimedia displays (for example, advertisements) for display on electronic devices. Thus, the original creator of an advertisement need not be directly involved in the production of a customized multimedia display, but may allow the intermediate distribution personnel to provide customization services.

It is a further object of the present invention to enable an electronic device to accept segment structures, text, and graphics data for use in displaying customized multimedia displays. As one example, the electronic device may include a high density disk drive used to load segment structures, text, and graphics attributes defining a customized multimedia display.

It is another object of the present invention to allow a single predefined display to be enhanced and modified in many different ways to produce numerous customized multimedia displays. Each customized multimedia display may be defined by a segment structure that protects certain elements of the multimedia display from alteration while allowing alteration of other elements of the multimedia display.

Still a further object of the present invention is to provide a mechanism for downloading and storing multimedia displays defined by a multimedia segment structure as well as executing the segment structure to generate the multimedia displays on a display, speakers, and the like associated with the electronic device. The segment structures may be executed according to a play sequence, for example, which proceeds through an alphabetic list of segment structures sequentially, and loops back to the first segment structure when the end of the list is reached.

Another object of the present invention is to provide predefined advertisements that include literal arguments and tokenized arguments. The present invention may protect files referenced by literal arguments with encryption to prevent substitution or modification by unauthorized personnel.

The present invention provides a multimedia segment structure defining customizable multimedia presentations. The multimedia segment structure includes at least one MAC segment with multimedia commands invoking multimedia effects. At least one of the multimedia commands includes a tokenized argument. The multimedia segment structure also includes at least one DAT segment including at least one command invoking the MAC segment. The DAT segment also includes one or more argument definitions corresponding the tokenized arguments used in the MAC segments. Thus, the DAT segment may customize a multimedia display by changing the value of the tokenized argument.

The commands in the MAC segment, or the MAC segment as a whole may be protected against alteration by encryption and/or password protection. The tokenized arguments thereby provided customization of an advertisement in the DAT segment while basing the advertisement on an underlying and unalterable structure defined in the MAC segment. As an example, the DAT segment may define the token PICT1 as "jukebox\_add.jpg" or as "dart\_game\_add.jpg" to produce a customized advertisement relating to jukeboxes or dart games, respectively.

The commands in the MAC segment may instruct the hardware in the electronic device, for example, to produce graphics and text on the display or actuate attached devices. For example, "LINE 540 50 100 430" draws a line from 540, 50 to 100, 430 on the display and "TEXT Arachnid" draws the text "Arachnid" on the display. The commands may also



US 6,191,780 B1

3

instruct the electronic device to display a bitmap, display an animation or movie, delay or wait, select particular fonts for text display, set transparent colors, and the like.

Other objects, features and advantages of the present invention will be readily apparent from the following description of certain preferred embodiments taken in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the disclosure.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows an electronic device which supports the execution of multimedia segment structures. The electronic device is a computerized jukebox capable of storing digital song data and running multimedia segment structures defining a multimedia presentation.

FIG. 2 shows an example of a MAC segment that defines an underlying template for an advertisement and a DAT segment that invokes the MAC segment as well as defines a token used in the MAC segment.

#### DETAILED DESCRIPTION OF THE INVENTION

Turning now to FIG. 1, a computerized jukebox 13 is shown having a computer controlled sophisticated audio production capability wherein each jukebox 13 is programmed to play songs that have been digitally compressed and stored in a large-volume data storage unit 93. The data storage unit 93 may be implemented as a magnetic memory (for example, a hard disk drive) and/or an optical memory (for example, a Compact Disk drive). The jukebox 13 is one example of an electronic device that may produce multimedia displays under control of a segment structure (discussed in detail below). The storage unit 93 and associated song library 91 may be an optical memory or any other available large volume nonvolatile computer memory that provides both read and write access.

A central management system (not shown) may communicate with each jukebox 13 via a transmission link or communications interface. For example, the central management system and each jukebox 13 may use the modem 19 to maintain serial communication on the communications interface. The communications interface may be a wire system such as public or private telephone lines or the like. However, the modems 19 may be replaced with RF (radio frequency) transceivers and associated antennas, a floppy disk drive, or a serial/parallel/network connection for direct communication with, for example, a laptop computer.

The jukebox 13 also includes a processing circuit 121 which contains a microprocessor 121A, read only memory (ROM) 121B and random access memory (RAM) 121C. As in conventional computer systems, the microprocessor 121A operates in accordance with the software program contained in the ROM 121B or loaded into the RAM 121C from hard disk or floppy disk. The RAM 121C is also used to store program variables, graphics and text data, and a variety of other data types. The processing circuit 121 controls the operation and flow of data into and out of the jukebox 13 through the modem 19 via a bus 124. Using the bus 124, the processing circuit 121 also controls a visual display 125, one or more input devices 123 and a coin/bill detector 126 to provide the user with an interactive interface to the jukebox 13. The input devices 123 provide signals representing user inputs such as displayed song selection. The input devices 123 may be implemented with a keyboard, touchscreen

4

display, or membrane switches, for example. The display 125 displays alphanumeric information as well as pictorial graphics to interface with the user. The coin/bill detector 126 is responsive to one or more coins or bills input by a customer to determine whether the proper amount of money has been input and to provide money detect signals coupled to the processing circuit. The processing circuit 121 further controls, via the bus 124, an audio reproduction circuit 127 coupled to a speaker system 129 along a bus 131 to provide an audio output to the user.

As noted above, the jukebox 13 may run multimedia segment structures defining, for instance, advertisements. The operation of the multimedia segment structure will be described with reference to the jukebox 13. It is noted however, that any electronic device may run segment structures if the electronic device includes a processing circuit and software capable of interpreting the multimedia segment structures.

Turning now to FIG. 2, that figure shows an example of two segments comprising a multimedia segment structure 200. An unencrypted control segment 202 (illustrated as stored in the file "template.mac") and a definition segment 204 (illustrated as stored in the file "ad1.dat") are shown. The jukebox 13 generally executes multimedia segment structures according to a play sequence. The play sequence, which may be fixed or dynamically determined, defines which multimedia segment structures to execute and when to execute them. For example, the segment structures may be executed according to a play sequence which proceeds through a list of segment structures sequentially, and loops back to the first segment structure when the end of the list is reached.

The definition segment 204 may, in turn, invoke a control segment that defines an underlying predefined advertisement. The control segment 202 generally includes commands that invoke multimedia effects or perform control functions. For example, ordered sequences of commands may instruct the electronic device to generate lines, circles, or other graphics on a display, and control internal or external lights, buzzers, flags, alarms and the like connected to the electronic device. Control segments or definition segments may be provided, for example, as files stored on a hard disk or the like, as data stored in ROMs or loaded into RAM, or as files or data stored on a floppy disk.

As one example, a drawing command (e.g., "CIRCLE 1 100 50 540 430" in the control segment 202) may be interpreted by the processing circuit 121 to generate a circle outline on the display 125 bounded by X,Y locations 100, 50 and 540, 430. Additional examples include the command "LINE 540 50 100 430" and "TEXT TEST" which draw a line from 540, 50 to 100, 430 and draw text corresponding to TEST on the display 125. Exemplary commands are given below in Table 1.

TABLE 1

Command	Explanation
CIRCLE<type><left><top><right><bottom>	Draws a circle, type 0 is filled, type 1 is a frame bounded by left, top and right, bottom.
LINE<x1><y1><x2><y2>	Draws a line from x1, y1 to x2, y2.
RECTANGLE<width><left><top><right><bottom>	Draws a rectangle width wide bounded by left, top and right, bottom.

US 6,191,780 B1

5

6

TABLE 1-continued

Command	Explanation
TEXT<text>	Draws text in an area defined by SETTEXTBOX.
SHOWFILE<left><top><right><bottom><file>	Shows a graphics file bounded by left, top and right, bottom.
SHOWFILESECTION<src-left><src-top><src-right><src-bottom><dest-left><dest-top><dest-right><dest-bottom><file>	Shows a section of a graphics file defined by src-left, src-top and src-right, src-bottom in an area defined by dest-left, dest-top and dest-right, dest-bottom.
SETFONT<font-number>	Sets the TEXT font to font-number.
SETCOLOR<color>	Sets the color (e.g., 0-255 or RGB value) used to draw graphics and text.
SETTEXTBOX<horz-justify><vert-justify><left><top><right><bottom>	Sets up a text box, where horz-justify = -1 for left, 0 for center, 1 for right, bounded by left, top and right, bottom.
SETTRANSPARENTCOLOR<color>	Sets the color which is treated as transparent.
DELAY<time-ms>	Delays for time-ms in milliseconds.
SETLIGHT<light><state>	Sets the light identified by light to the state (e.g., the left light to on, off, or flashing).

Note that the commands accept one or more arguments, either in literal form (for example, specifically naming text, XY locations, or filenames as in "arachnid.bmp"), or in a tokenized form in which identifiers (for example, "TEST") are used as placeholders for an actual argument. The objects referenced by a literal argument (including graphics files, sound files, and animation files, for example) may be encrypted to prevent substitution or modification by unauthorized personnel.

The tokenized arguments may be flagged in the control segment using non-alphanumeric characters (e.g., the caret (^) symbol). Thus, TEXT "TEST" in FIG. 2 may be interpreted by the jukebox 13 as a reference to a definition for the token TEST in a supporting segment (for example, the definition segment 204). The supporting definition segment may then, for example, define TEST as "This is a test message."

The supporting DAT segment may be modified by route operators to create custom advertisements simply by changing the values of the tokenized arguments in a definition segment. A DAT segment is not always necessary, however. If the underlying advertisement definition in a MAC segment does not contain any tokens, or cannot otherwise be modified (e.g., due to encryption), then the play sequence may indicate that the MAC segment should be played directly (without executing a definition segment first).

On the other hand, a customized advertisement will include a customized DAT segment using a segment association to reference a MAC segment. The play sequence will then indicate that the DAT segment will be executed (rather than the MAC segment). The first step in executing a DAT segment is invoking an underlying predefined MAC segment. Thus, in FIG. 2, the DAT segment 204 invokes (with the TEMPLATE command) the MAC segment "template.mac" 202. The TEMPLATE command is one example of an association between a definition segment and a MAC

segment. Other segment associations may be used, including pointers, program branches, and program jumps, for example. Program branches or jumps may be used, for example, when a MAC segment and a DAT segment are concatenated into a single segment or stored in a single file (similar to branches, jumps, or function calls in the 'C' language). Similarly, a DAT file may use a pointer, for example, when a MAC segment is stored in RAM or ROM at a known location.

The jukebox 13 also reads any definitions provided in the DAT segment 204. The jukebox 13 thus assigns the text "This is a test message." to the token TEST. When the jukebox invokes the MAC segment 202, the jukebox sets the drawing color to 254 (which may be an absolute color number or an index into a color table), draws a circle, draws a line through the circle, changes font to font number 2 (which may correspond to any predefined font stored in the jukebox 13), sets up a centering text box bounded by 100, 100 and 540, 150, and displays text corresponding to the token TEST, defined in the DAT segment 204 as "This is a test message."

MAC and DAT segments containing predefined advertising templates and customized token definitions may be stored in each electronic device, may be transmitted by the central management system to the electronic device periodically, or may be transferred to the electronic device with a floppy disc, network connection, or serial/parallel port connection. Similarly, the graphics, text, and the like that support the advertisements may be stored in the electronic device or transferred to the electronic device by the methods listed above. A catalog of MAC segments defining a set of predefined advertisements may be entrusted to route operators or other intermediate distribution personnel who are responsible for generating modified DAT segments defining modified advertisements based on an underlying MAC segment in the catalog.

There are many instances in which advertisements may benefit from customization using DAT segments. For example, a particular electronic device installed in a bar may need to display customized advertisements relating to local pizza delivery services. A route operator may then choose a predefined pizza advertisement control file from a catalog of MAC files. Because the predefined control file would typically not include the correct name, address, or phone number for the local pizza service, the route operator may change token values in an associated definition file to customize the advertisement for Tony's Pizza, for example. The resulting customized pizza advertisement may thereby use predefined graphics files referenced by the control file, while including customized text for the name, address, and/or phone number for the local pizza establishment. As another example, a customized advertisement may provide job listings for local employment agencies. Thus, a definition file may change the value of tokens provided in an underlying control file, for instance, to add a graphic for the employment agency logo, to add text for the employment agency's name and slogan, and to add several lines of text listing the actual job openings.

It is also desirable, in some instances, to prevent a route operator from modifying certain parts of the control segment (or the entire control segment). For example, advertisers that expend a great deal of money to develop national-based advertisements represented by a control segment typically require assurance that the advertisement will not be modified when displayed on an electronic device. In other instances, only a portion of the advertisement (for example, the text or graphics generally, or the text or graphics displayed at



US 6,191,780 B1

7

particular times or places in the advertisement) may need protection from customization by a route operator. Thus, in a preferred embodiment, encryption or password protection is applied to commands in the control segment or the control segment itself to prevent alteration. Similarly, encryption may be further applied to the literal arguments of the control segment.

It is noted that the text commands discussed above and shown in Table 1 are only one way of implementing the control and definition segments defining an advertisement and that sophisticated scripting languages may be used to generate extremely versatile advertisements. Another approach, however, includes compiling the text commands into a machine-readable form, or directly providing sequences of binary codes that the processing circuit 121 is able to interpret to control the multimedia functions of an electronic device. Furthermore, a control segment and associated definition segments may be concatenated into a single file for storage, retrieval, or transmission purposes.

While particular elements, embodiments and applications of the present invention have been shown and described, it will be understood, of course that the invention is not limited thereto since modifications may be made by those skilled in the art, particularly in light of the foregoing teachings. It is therefore contemplated by the appended claims to cover such modifications as incorporate those features which come within the spirit and scope of the invention.

What is claimed is:

1. An electronic device for executing a customized advertisement multimedia display, the electronic device comprising:

- a memory storing a multimedia segment structure, the multimedia segment structure comprising:
  - a. a control segment implementing a predefined advertisement and comprising at least one multimedia command invoking at least one multimedia effect, the multimedia command including a placeholder tokenized argument; and
  - b. a definition segment comprising a segment association invoking the control segment and an argument definition of the tokenized argument, the argument definition customizing the predefined advertisement for local display;

the memory also storing a play sequence listing the definition segment and thereby determining when the multimedia segment structure is executed;

8

and

a processor for executing the multimedia segment structure in accordance with the play sequence.

2. The electronic device of claim 1, wherein at least one of the multimedia commands in the control segment is protected against alteration by encryption.

3. The electronic device of claim 1, wherein the control segment is protected against alteration by encryption.

4. The electronic device of claim 1 configured as a computer jukebox further comprising:

- speakers connected to a digital to analog converter;
- a selector for causing the electronic device to retire and play data representing a song selected from a plurality of songs stored by the electronic device in the memory; and

a communications interface for receiving the control segment and the play sequence from a central management system storing a catalog of predefined advertisement control segments.

5. The electronic device of claim 4, further comprising a display connected to the processor.

6. The electronic device of claim 4, wherein the control segment is protected against alteration by encryption.

7. The electronic device of claim 1 configured as an electronic dart game further comprising:

- a dart board interfaced with the processor; and
- a communications interface for receiving the control segment and the play sequence from a central management system storing a catalog of predefined advertisement control segments.

8. The electronic device of claim 7, wherein the control segment is protected against alteration by encryption.

9. The electronic device of claim 1, wherein the control segment further comprises a second multimedia command with a literal argument.

10. The electronic device of claim 9, wherein the literal argument refers to an encrypted graphics file.

11. The electronic device of claim 1, wherein the tokenized argument is flagged using non-alphanumeric characters.

12. The electronic device of claim 1, wherein the control segment is transferred into the memory from a catalog of predefined advertisement control segments.

\* \* \* \* \*

# **Exhibit J**





US005848398A

**United States Patent** [19]

Martin et al.

[11] **Patent Number:** 5,848,398[45] **Date of Patent:** Dec. 8, 1998[54] **SYSTEM FOR MANAGING A PLURALITY OF COMPUTER JUKEBOXES**[75] Inventors: **John R. Martin; Michael L. Tillery; Samuel N. Zammuto**, all of Rockford, Ill.[73] Assignee: **Arachnid, Inc.**, Rockford, Ill.[21] Appl. No.: **638,022**[22] Filed: **Apr. 25, 1996****Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 584,253, Jan. 11, 1996, Pat. No. 5,781,889, which is a continuation of Ser. No. 268,782, Jun. 30, 1994, abandoned, which is a continuation of Ser. No. 538,981, Jun. 15, 1990, abandoned.

[51] Int. Cl.<sup>6</sup> ..... **G06F 17/60**[52] U.S. Cl. .... **705/14; 364/479.04**

[58] Field of Search ..... 705/1, 10, 14; 369/32; 235/381; 364/479.01, 479.04, 479.06, 479.02, 407.03

[56] **References Cited****U.S. PATENT DOCUMENTS**

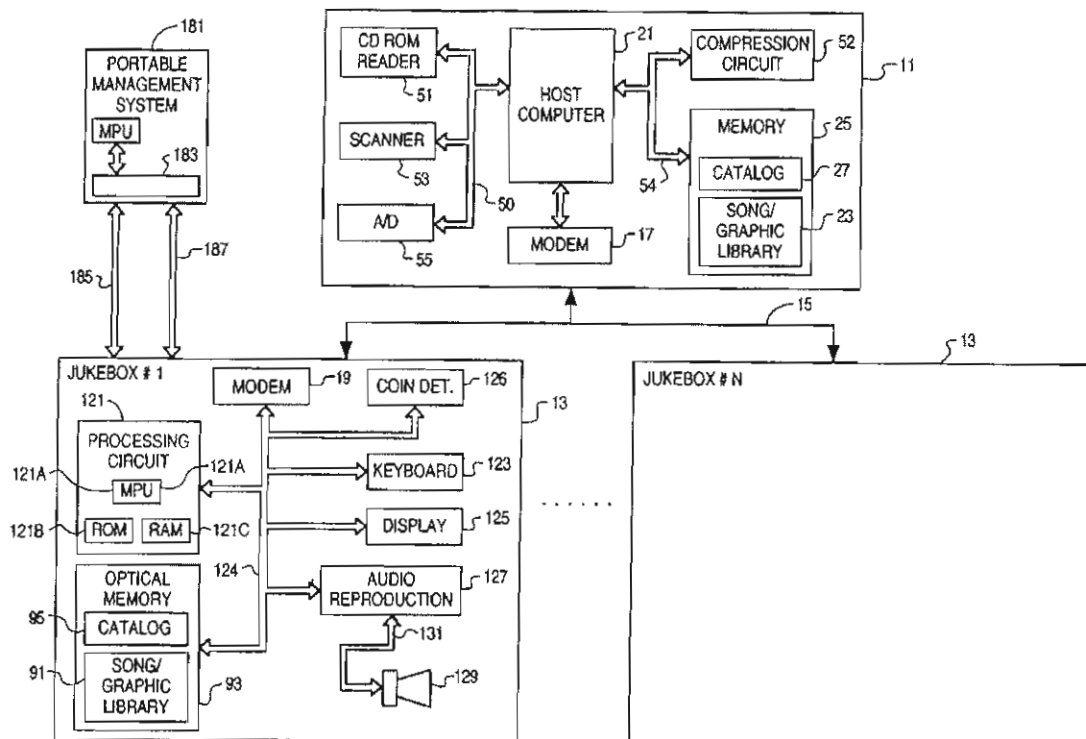
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2193420 2/1988 United Kingdom .

*Primary Examiner*—Allen R. MacDonald*Assistant Examiner*—Hani M. Kazimi*Attorney, Agent, or Firm*—McAndrews, Held, & Malloy, Ltd.[57] **ABSTRACT**

A method and apparatus as shown for managing a plurality of computer jukeboxes at different locations from a central station. Each jukebox includes processor means for controlling the computer jukebox, storage and retrieval means for data, display means for selection menus, audio production means for playing musical records, and a user interface enabling patrons to communicate with the processor means. The central station can be used to download musical recording data to each computer jukebox, and each computer jukebox can upload usage data to the central station.

**11 Claims, 5 Drawing Sheets**

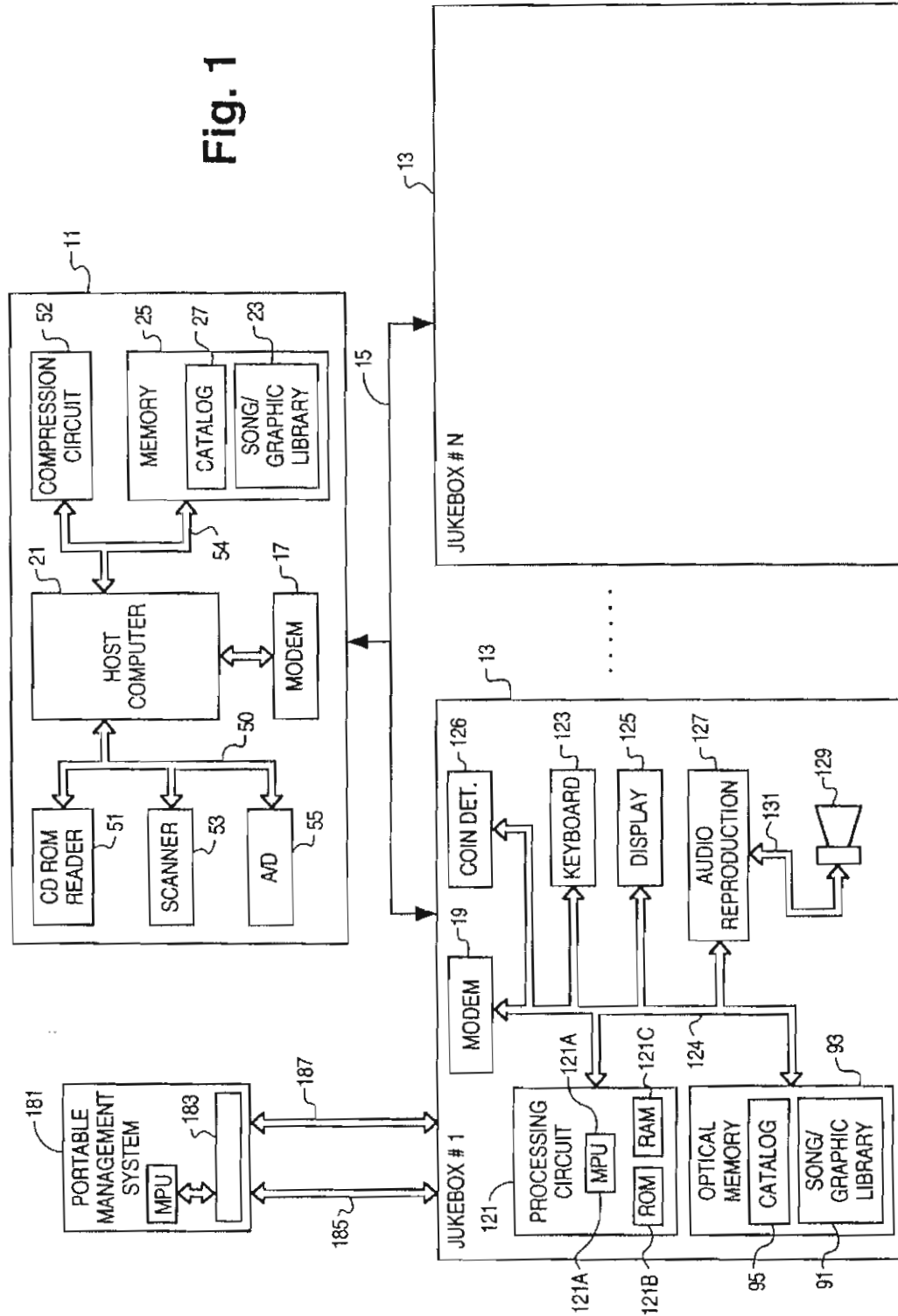
U.S. Patent

Dec. 8, 1998

Sheet 1 of 5

5,848,398

Fig. 1



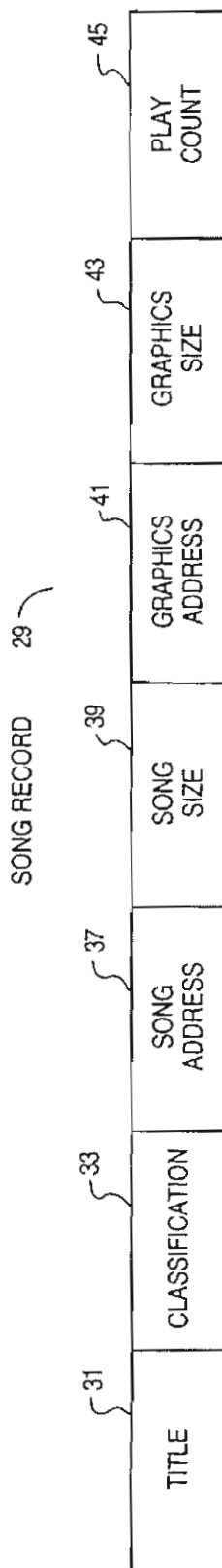
U.S. Patent

Dec. 8, 1998

Sheet 2 of 5

5,848,398

Fig. 2



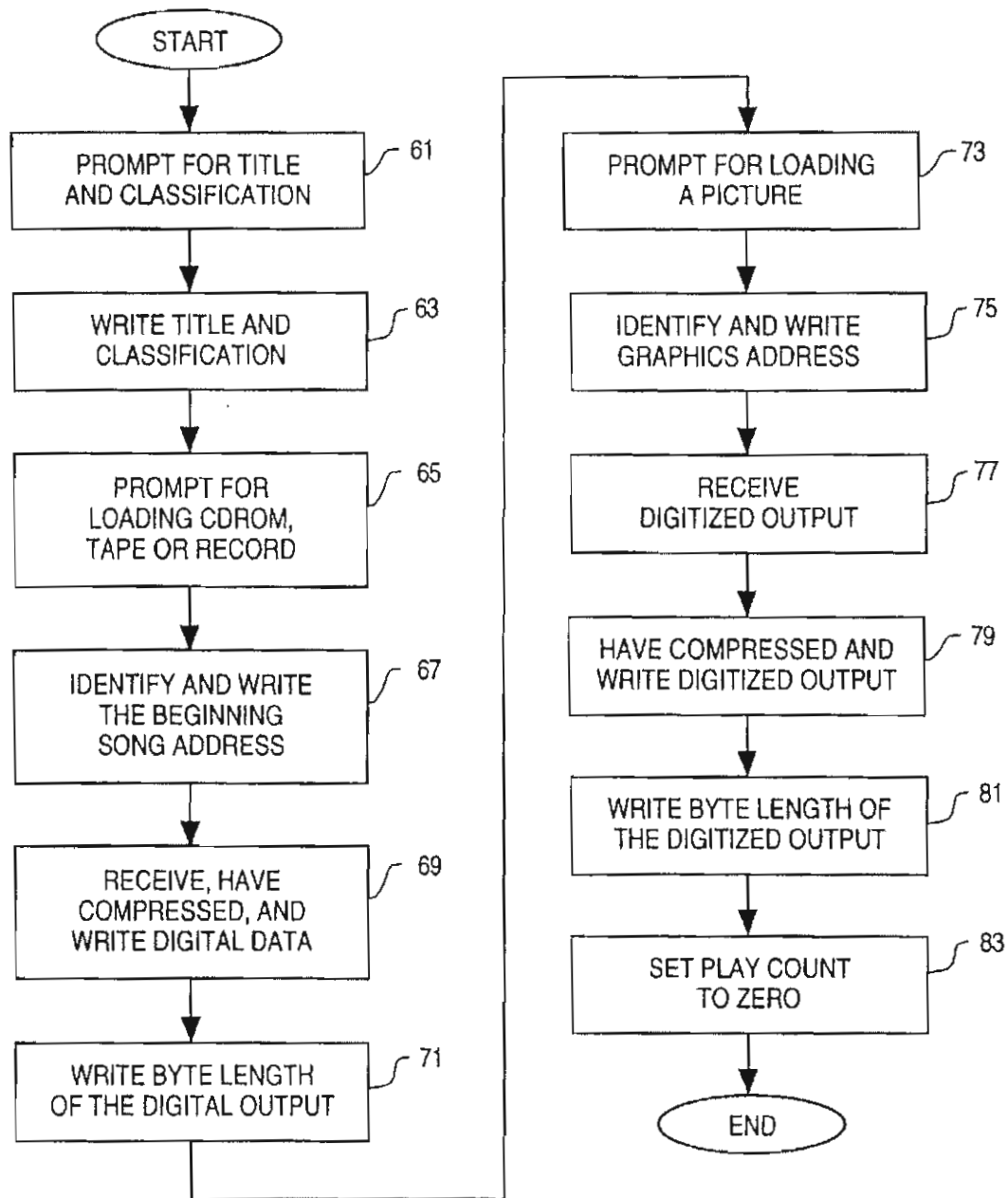
U.S. Patent

Dec. 8, 1998

Sheet 3 of 5

5,848,398

Fig. 3





U.S. Patent

Dec. 8, 1998

Sheet 4 of 5

5,848,398

Fig. 4A

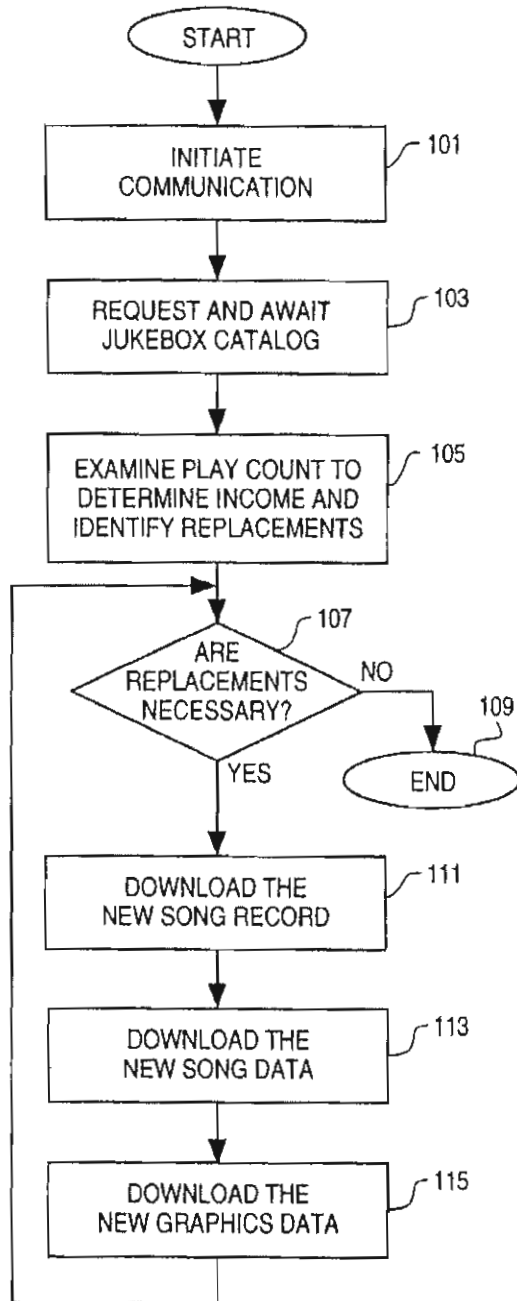
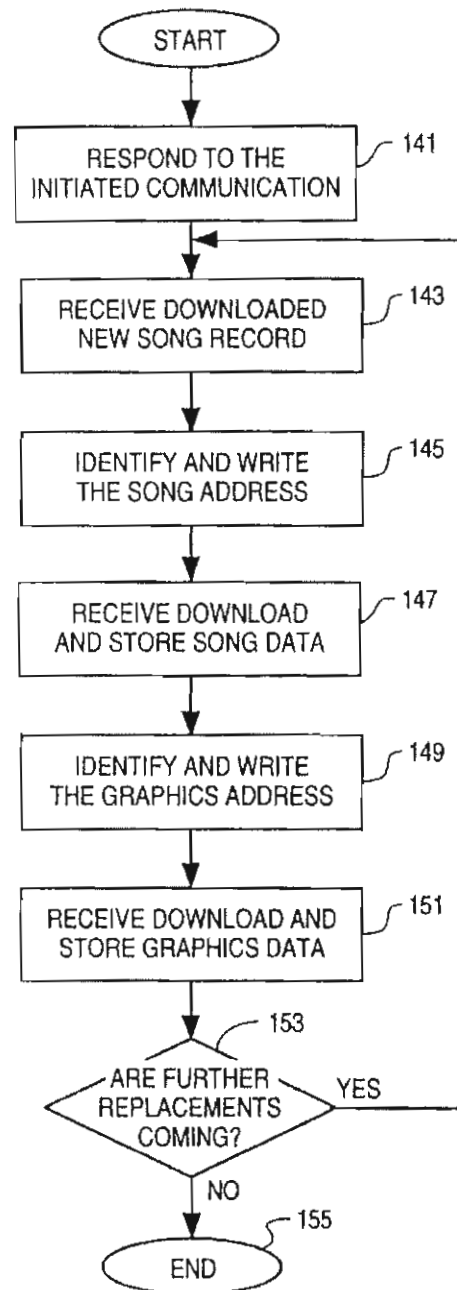


Fig. 4B



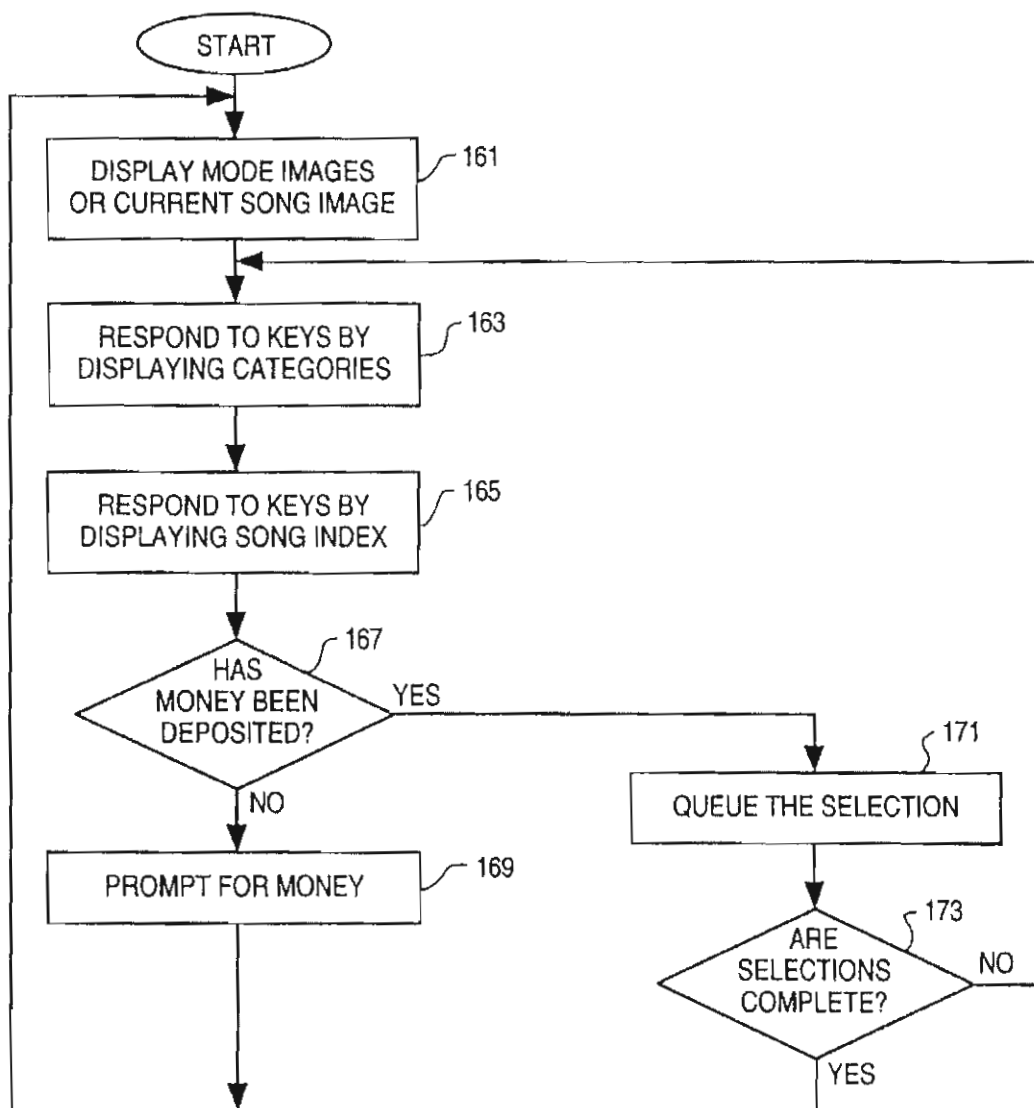
U.S. Patent

Dec. 8, 1998

Sheet 5 of 5

5,848,398

Fig. 5



5,848,398

1

## SYSTEM FOR MANAGING A PLURALITY OF COMPUTER JUKEBOXES

This is a continuation-in-part of U.S. patent application Ser. No. 08/584,253, filed Jan. 11, 1996 now U.S. Pat. No. 5,781,889, which is a continuation of U.S. patent application Ser. No. 08/268,782, filed Jun. 30, 1994 now abandoned, which is a continuation of U.S. patent application Ser. No. 07/538,981, filed Jun. 15, 1990 now abandoned.

### FIELD OF THE INVENTION

The present invention relates generally to a jukebox system, and more particularly to such a system including one or more computer jukeboxes that can be managed from a remote location.

### BACKGROUND OF THE INVENTION

Heretofore, an assortment of musical recordings found in a jukebox consists of a plurality of records, each record containing a specific recording. Traditionally, these records are grooved phonograph records. After a patron makes a selection, the selected phonograph record is mechanically removed from a storage rack within the jukebox, and the phonograph record is placed upon rotating platform. A stylus which is connected to a speaker system is then placed upon the rotating phonograph record, resulting in the phonograph record being played by the jukebox. For each selection, a separate phonograph record must be removed from the storage rack in order to be played by the jukebox.

Conventional jukeboxes have also implemented compact disks as means for creating an assortment of musical songs. Compact disks provide the improved sound quality made possible by digital recordings. The same technique, however, is used to play compact disks. A separate compact disk corresponding to each selection must be removed from a storage rack in order for the jukebox to play the selection.

Updating conventional jukeboxes is a costly and time consuming task. Routemen must periodically travel to each jukebox location and replace the existing recordings of each jukebox with up-to-date records. The existing recordings are no longer used by the jukebox once removed, thus making the conventional method wasteful.

Routemen must also travel to each jukebox location to keep a tally of the number of times each musical recording is selected in order to determine royalty fees. It is known to provide a jukebox with a counter that keeps track of the number of times each musical recording is selected, but routemen must still travel to each jukebox location to obtain this information. Such a process requires an excessive number of people to visit each jukebox location periodically and visually read the information off the counter within each jukebox. Since the number of jukeboxes in operation is quite large, the employment of routemen to obtain such data involves a considerable expense. Furthermore, the ever changing nature of the recording industry requires that such data be gathered frequently in order to keep abreast of a continually changing market.

Conventional jukeboxes display a selection menu allowing a patron to select a particular recording that he or she may want to hear. When that song is being played, a video accompanying the song is typically displayed on the screen. However, when the jukebox is not being used either the selection menu is still continually displayed or the screen is blank.

### OBJECTS AND SUMMARY OF THE INVENTION

Accordingly, it is a primary object of the present invention to provide a method and apparatus for managing a plurality

2

of computer jukeboxes which is capable of eliminating the necessity for routemen to change records in the jukeboxes. The computer jukeboxes store recordings in memory, thus enabling routemen to simply load new recordings into the memory of each computer jukebox.

Another object of the present invention is to eliminate a necessity for routemen by enabling new recordings and selection menus to be downloaded to each computer jukebox via a transmission link. In that regard, it is an object of the present invention to provide a method and apparatus which eliminates the material waste usually associated with updating jukeboxes. Instead of throwing away old recordings and replacing them with new ones, as is the conventional procedure, the present invention eliminates this waste by enabling new recordings to simply be downloaded into the memory of each computer jukebox. The old recordings are simply erased, if necessary.

Another object of the present invention is to provide a method and apparatus which is capable of remotely obtaining jukebox usage data, thus eliminating a necessity for routemen to do this task. The present invention utilizes a computer jukebox, which as part of its software programming, stores the number of times each musical recording is played and the number of credits that have been awarded. This data is uploaded to a central control device via a transmission link.

An additional object of the present invention is to provide a method and apparatus utilizing modern computer technology to digitally store and play musical records. The jukebox of the present invention is basically a computer having a sophisticated audio production capability, the computer storing digitized song data in a computer memory. Because conventional jukeboxes maintain compact discs or records in the jukebox, theft of the compact disc/records has been a problem, this problem being eliminated by the present invention's utilization of a computer memory to store the digitized song data.

A further object of the present invention is to provide a method and apparatus capable of being used with the remote management of jukeboxes via public telephone lines without interfering with an establishments' use of their own phone lines.

Still a further object of the present invention is to provide a method and apparatus for downloading and storing advertisements to a computer jukebox, and then running the advertisements on a screen associated with the computer jukebox at specified times. Additionally, the jukebox may also be associated with an electronic game so that advertisements not be run on a screen of the electronic game when the game is not being played.

It is a related object of the present invention to track the number of times a particular advertisement is actually run so that the advertiser can be appropriately billed. This information is uploaded to the central control device via the transmission link.

Other objects, features and advantages of the present invention will be readily apparent from the following description of certain preferred embodiments thereof taken in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the disclosure.

### BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a block diagram of the computer jukebox system of the present invention;



5,848,398

3

FIG. 2 is an illustration of the data structure of an individual song record stored in a master library catalog illustrated in FIG. 1;

FIG. 3 is a flow-chart illustrating the procedure for storing new songs in a bulk storage unit illustrated in FIG. 1;

FIGS. 4A and B are flow-charts illustrating the software procedures used by the central management system and the jukebox respectively in managing the song library of the jukebox; and

FIG. 5 is a flow-chart illustrating the specific operation of the jukebox in interfacing with a user.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

In accordance with the, present invention as shown in FIG. 1, a central management system 11 monitors and updates the available selection of music at a number of remotely located jukeboxes such as a jukebox 13. Particularly, the central management system 11 monitors each jukebox 13 to determine the number of times each song has been played. From these numbers, the central management system 11 can calculate the royalty payments that are due. More importantly, the central management system 11 can identify those specific songs which need to be replaced in each jukebox on an individual basis, the central management system communicating replacement songs to each jukebox 13 to update the available music selection therein as needed.

Each jukebox 13 is basically a computer having sophisticated audio production capability wherein each computer jukebox 13 is programmed to play songs that have been digitally compressed and stored in a large-volume data storage unit 93. The storage unit 93 may be an optical memory or any other available large volume nonvolatile computer memory that provides both read and write access.

The central management system 11 communicates with each computer jukebox 13 via a transmission link 15. The central management system 11 and each jukebox 13 use respective modems 17 and 19 to maintain serial communication on the transmission link 15. The transmission link 15 may be a cable system such as public or private telephone lines or the like. However, the modems 17 and 19 may be replaced with RF (radio frequency) transceivers and associated antennas. In the latter instance the transmission link 15 is an RF link.

Additionally, in another embodiment, an audio codec may be included as part of the central management system 11. The audio codec receives analog audio input, converts it into digital bytes, and then compresses these bytes via known audio compression methods for economic transmission, such as by the commercially available "MUSICAM®" algorithm. The compressed digital audio can then be transmitted to the jukebox 13 by the transmission link 15 which, in addition to the above described system such as telephone lines, cable, RF links or modems, can include transmission via a sub carrier to utilize certain FM channels. In this embodiment, the audio information is transmitted in packets of a predetermined length. Each packet is organized such that a header is transmitted first. The header is followed by the compressed audio data and then by a trailer containing an error detection method to ensure that the audio was transferred properly.

In another embodiment, the central management system 11 transmits the compressed audio data via satellite or cellular telephone systems. In either of these cases, the transmission link 15 is a satellite uplink or a cellular uplink.

4

In yet another embodiment, the audio information may be stored on a portable infra red device, and the information may be transmitted from the device via infra red rays to the computer jukebox 13. As discussed in more detail below, the central management system 11 can transmit other information, specifically video and graphic information via the transmission link 15 to the computer jukebox 13.

Specifically, the central management system 11 includes a host computer 21 which maintains a master library 23 of songs and associated graphics which are stored in a compressed digital form in a bulk storage unit 25. The bulk storage unit 25 is capable of storing vast amounts of digital data, and may take the form of a read-write optical storage device. The host computer 21 indexes the master library 23 by using a master catalog 27 which is also maintained in the bulk storage unit 25.

The master catalog 27 stores a song record 29, as illustrated in FIG. 2, for each song stored in the master library 23. Each song record 29 associates information in the following fields: a) title field 31, containing the name of the song; b) a classification field 33, containing the type of music, i.e., country, pop, jazz, classical, etc.; c) a song address field 37, containing the beginning address in the bulk storage unit 25 of the compressed digital data of the song; d) a song size field 39, containing the number of bytes in length of the compressed digital data; e) a graphics address field 41, containing the beginning address in the bulk storage unit 25 of the compressed digital data of a graphics image, if any, to be associated with the song; f) a graphics size field 43, containing the number of bytes in length of the compressed graphics image; and g) a play count field 45, containing a count which indicates the number of times this specific song has been played. By parsing the master catalog 27, the host computer 21 can quickly locate all available information relating to any available song. The master catalog 27 also stores data particular to each jukebox such as the number of times each available song has been played, the coin intake for that jukebox, etc. The data particular to each jukebox is uploaded from the jukebox to the central management system 11 to update the master catalog 27.

Returning to FIG. 1, in order to add to the master library 23 and associated master catalog 27, the host computer 21 receives, has compressed and stores in the bulk storage unit 25 digital data representing the new song and associated pictorial graphics. The host computer 21 receives the digital data for storage from three sources: 1) a compact disc read only memory (CDROM) reader 51, which reads CDROMs; 2) a graphics scanner 53, which digitizes pictorial graphic images; and 3) an analog to digital (A/D) reader/converter 55, which reads analog data from both tapes and records and then converts the analog data into digital data. A compression circuit 52 using an adaptive-delta, pulse-code-modulation compression scheme compresses the digital data before it is stored. Other compression schemes may also be used. The compression circuit 52 might also be fully replaced by a software algorithm, such as MUSICAM®, which is executed by the host computer 21.

FIG. 3 more specifically illustrates the operation of the host computer 21 in adding new songs to the master library 23. At a block 61, the user is initially prompted by the host computer 21 to enter a new song title and category. The host computer 21 writes this information into the title field 31 and classification field 33 of a new song record 29 at a block 63. Next, at a block 65, the host computer 21 prompts the user to place either a CDROM into the reader 51 or a record or tape into the reader/converter 55. After the user has completed this placement, at a block 67 the host computer 21



5,848,398

5

identifies available storage space in the bulk storage unit 25 by analyzing the space in use as described in the current list of song records 29 in the master catalog 23. The beginning address of this available storage space is placed in the song address field 37 of the new song record 29. Thereafter, at a block 69, the host computer 21 provides a read enable signal on a bus 50 to either the reader 51 or reader/converter 55. Either the reader 51 or reader/converter 55 responds by reading and sending digital data representing the new song to the host computer 21 via the bus 50. Utilizing a bus 54, the host computer 21 forwards the digital data received to the compression circuit 52, receives compressed digital data from the compression circuit 52 and writes the compressed digital data into the bulk storage unit 25. At a block 71, upon reaching the end of the digital data output, i.e., the end of a song, the host computer 21 writes the byte length of the digital output into the song size field 39.

The host computer 21 at a block 73 prompts the user to load a picture, such as an album cover, into the graphics scanner 53. At a block 75, the host computer 21 identifies further available storage space in the bulk storage unit 25 and places the beginning address thereof into the graphics address field 41. Once a picture is loaded, the host computer 21 at block 77, using the bus 50, provides a read enable signal to the scanner 53 which responds via bus 50 by digitizing the picture and transferring the digitized output to the host computer 21. At a block 79, using the bus 54, the host computer 21 forwards the digitized data of the picture to the compression circuit 52, receives compressed digitized data from the compression circuit 52, and writes the compressed digitized data into the bulk storage unit 25. At a block 81, upon reaching the end of the digitized output, i.e., the end of the picture, the host computer 21 places the byte length of the digitized output into the graphics size field 43. Finally, at a block 83, the host computer 21 sets the play count field 45 to zero (0). This flow-chart is repeated as necessary until all of the new songs are added to the master library 27. It is noted that the operator can also delete, modify or replace any specific song record 29 found in the master catalog 23 and master library 27.

Returning to FIG. 1, each computer jukebox 13 plays songs and displays graphics which are stored locally in the large-volume data storage unit 93. The storage unit 93 of the jukebox 13 contains a subset of the songs found in the master library 27 maintained by the central management system 11. More specifically, the storage unit 93 of the jukebox 13 stores a song library 91 which is a corresponding subset of the master library 27. The song library 91 contains all of the currently available song selections and associated pictorial graphics for the jukebox 13. The storage unit 93 also stores a catalog 95 that is an index into the local song library 91. The catalog 95 is similar to the master catalog 23. Both the song library 91 and associated catalog 95 are monitored and updated by the central management system 11 as needed via the transmission link 15. The jukebox 13 permits this monitoring and updating at any time with no impact on its end-user performance.

The jukebox 13 also includes a processing circuit 121 which contains a microprocessor 121A, read only memory (ROM) 121B and random access memory (RAM) 121C. As in conventional computer systems, the microprocessor 121A operates in accordance with the software program contained in the ROM 121B and utilizes the RAM 121C for scratchpad memory. The processing circuit 121 may also contain a decompression circuit (not shown) or may perform decompression using a software algorithm stored in the ROM 121B depending on the type of data compression scheme used by

6

the central management system 11. In either case, decompression is necessary to decompress the compressed data received from the central control system 11 so that the song can be played and associated graphics image displayed.

The processing circuit 121 controls the operation and flow of data into and out of the jukebox 13 through the modem 19 via a bus 124. Using the bus 124, the processing circuit 121 also controls a visual display 125, one or more selection keys 123 and a coin/bill detector 126 to provide the user with an interactive interface to the jukebox 13. The keys 123 provide signals representing user inputs such as displayed song selection. The display 125 displays alpha numeric information as well as pictorial graphics to interface with the user. The coin/bill detector 126 is responsive to one or more coins or bills input by a customer to determine whether the proper amount of money has been input and to provide money detect signals coupled to the processing circuit. The processing circuit 121 further controls, via the bus 124, an audio reproduction circuit 127 coupled to a speaker system 129 along a bus 131 to provide an audio output to the user.

FIGS. 4A and 4B are flow-charts illustrating the software procedures respectively used by the central management system 11 and the jukebox 13 in managing the song library 91 of the jukebox 13. At a block 101, the central management system 11 initiates communication with one of the jukeboxes 13 via the transmission link 15.

Immediately thereafter, at a block 103, the management system 11 requests that the jukebox data be sent including a copy of the catalog 95. At a corresponding block 141, the jukebox 13 responds by sending the copy of the catalog file as well as other jukebox data including total money intake over a period of time. The data sent from the jukebox to the management station may also include customer requests for new songs, a customer utilizing the display and keyboard of the jukebox 13 to enter song request data as discussed below. Thereafter, at a block 105, by examining each play count field 45 in the copy of the catalog 95 received, the management system 11 determines the royalty amount due per song and whether to replace or update specific song entries stored in the jukebox 13. The management system 11 also determines the total money intake from the play count information and compares this value to the total money intake value received from the jukebox to provide a check. At an inquiry block 107, if no replacements are necessary, the management system 11 branches to a block 109 to terminate communication with the jukebox 13. If, however, replacements are necessary, the management system 11 branches to download the changes. Particularly, at a block 111, the management system 11 downloads to the jukebox 13 the song records 29 of both the song to be replaced and the replacement song. In a corresponding block 143, the jukebox 13 replaces the song record 29 in the catalog 95.

Thereafter, the jukebox 13 identifies available storage space in the storage unit 93 based on the song size field 39 of the new song, and writes the beginning address thereof into the song address field 37 in a corresponding block 145. Afterwards, at a block 113, the central management system 11 downloads the compressed digital data of the song to the jukebox 13. Afterwards, at a block 113 the central management system 11 downloads the compressed digital data of the song to the jukebox 13. At a corresponding block 147, the jukebox 13 receives and writes the data into the song library 91. Next, at a corresponding block 149, the jukebox 13 identifies available storage space in the storage unit 93 based on the graphics size field 43, and writes the beginning address thereof into the graphics address field 41 of the new song. Thereafter, at a block 115, the management system 11

5,848,398

7

downloads the compressed digitized data of the picture to the jukebox 13. The jukebox, at a corresponding block 151, receives and writes the data into the song library 91. Finally, the block 107 is again encountered. If further replacements need to be made, the blocks 111, 113 and 115 are repeated until complete. At a corresponding block 153, the jukebox similarly repeats the corresponding blocks 143 through 151 until no further replacements need to be made. A further block placed immediately above the block 107 may also be used, wherein the central management system 11 sends a delete, modify, add or replace command to the jukebox 13 before downloading into the song library 93. In this way, the management system 11 receives additional flexibility in updating the jukebox 13. It is noted that the jukebox 13 can also initiate communications with the management system 11 at predetermined times or if the jukebox determines that an event has occurred that the management system 11 should be aware of.

FIG. 5 is a flow-chart illustrating the specific operation of the processing circuit 121 of the jukebox 13 in interfacing with the user. At a block 161, if no song selection is playing, the processing circuit 121 operates in a user attract mode, displaying a random sequence of available graphic images on the visual display 125. More particularly, the processing circuit 121 randomly selects a starting address of the compressed graphics data from the available song records 29 in the catalog 95. From that starting address, the circuit 121 retrieves the data from the song library 91 via the bus 124. The circuit 121 decompresses and transfers the data along the bus 124 to the visual display 125 for display. Thereafter, the circuit 121 again randomly selects a starting address of available graphics data and this cycle repeats. If, however, a song selection is being played when the block 161 is encountered, the attract mode sequencing does not occur. Instead, the circuit 121 displays the associated graphics image of the song being played on the display 125. During the attract mode the processing circuit 121 may also control the display 125 to present a prompt requesting customers to enter new song requests. The new song request data entered by a customer using the keyboard is stored and uploaded to the management system 11 to aid the system 11 in determining whether new song data should be downloaded to the jukebox.

At a block 163, the processing circuit 121 responds to a signal indicating user interest from the selection keys 123 by providing on the display 125 those music categories, i.e., country, rock, jazz, etc., found in the catalog 95. At a block 165, the circuit 121 responds to a signal indicating a category selection from the keys 123 by providing on the display 125 an index of available songs, arranged alphabetically either by artist or title, which can be scrolled and selected using the keys 123. Upon selection of a specific song, the circuit 121 encounters an inquiry block 167. If at the block 167 the circuit 121 determines from the signal received from the money detector 125 that a sufficient amount of money has not been deposited, a branch to a block 169 occurs. At the block 169, using the display 125, the circuit 121 prompts the user to deposit money into the coin/bill detector 126, then branches back to the block 161. However, if sufficient moneys have been deposited, the circuit 121 branches to a block 171 wherein the circuit 121 updates the play count field of the selected song's record in the catalog file 95 and money intake data stored in the memory. The circuit also places the song record 29 corresponding to the selected song into a queue of song records to be played. After the selection is queued, the circuit 121 encounters an inquiry block 153. If the total number of

8

selections purchased have been selected, the circuit 121 branches back to the block 161. Otherwise, if further purchased selections are forthcoming, the circuit 121 branches back to the block 163. In this manner, all of the selections are made and placed in the queue. Upon completion of playing a queued-up, selected song, the circuit 121 removes the corresponding song record 29 from the queue, selects the next song record in the queue, begins to play that next song, and executes the block 161. It is noted that the song queue can be displayed on the display 125 in order to show customers what songs have already been selected prior to making their selection.

More specifically, referring back to FIG. 1, once a specific song has been selected and queued-up, the processing circuit 121 first identifies the beginning address of the compressed digital data from the song address field 37 of the song record 29 in the queue. From this address, using the bus 124, the circuit 121 reads the compressed digital data out of the storage unit 93, decompresses that data, and sends the decompressed digital data to the audio reproduction circuit 127. The audio reproduction circuit 127, commonly found in CDROM readers and associated amplifiers, converts the digital data to an analog signal which is amplified and used to drive the speaker system 129 via the bus 131. After a selected song finishes playing, the processing circuit 121 deletes the song record 29 of the selected song from the queue, increments the play count field 45 associated with that song in the catalog 95, and begins playing the next selected song in the queue if any exists. The process set forth in the flow-chart detailed in FIG. 5 is then repeated.

While the present invention is being described and illustrated in accordance with the preferred embodiment enabling new recordings and computer usage data to be transferred via the transmission line 15, the monitoring and updating may also be directly transferred. In this latter embodiment, routemen physically visit the location of each computer jukebox 13. During these visits, the routemen carry a portable management system 181 which has only a subset of potential replacement songs stored in a subset library and associated catalog (not shown) on a portable bulk storage unit 183. The subset library is loaded by the portable management system 181 onto the portable bulk storage unit 183 either directly from the bulk storage unit 25 or indirectly as is initially done by the central management system 11 (described above). In all other ways, the portable management system 181 operates the same as the central management system 11, collecting the catalog 95 of each jukebox 13 and updating or replacing as necessary. To accomplish this, the portable management system 181 communicates at a very high rate of speed with the jukebox 13 via a parallel communication link 185 and a direct memory access (DMA) link 187.

Additionally, the routemen may simply exchange the "old" storage unit 93 with a pre-loaded storage unit (not shown). The central management system 11 may later read the "old" storage unit 93 to gather the information from the catalog 95. Such an embodiment still enjoys the other advantages made possible by the computer jukeboxes 13 described herein.

Additionally, the visual display 125 can be directed to display various advertisements. The advertisements are downloaded from the central management system 11 to selected computer jukeboxes 13 via the transmission link 15. Also downloaded with the advertisements is digital data representing the identity of each advertisement, the number of times, and when each of the advertisements is to be run. The advertisement data is stored at a separate location on the storage unit 93 so that they can be easily located and tracked.



5,848,398

9

The advertisements like the audio data are preferably sent to the computer jukebox 13 in compressed form, using a known compression scheme. The compressed data is preferably sent in packets that contain a header. The header contains information about the advertisement including how many times a day the advertisement should be run and at what times. The advertisements can then be displayed at the predetermined times on the visual display 125.

In the preferred embodiment, if a conflict arises between a song being played and the time for an advertisement to be played, the conflict is resolved as follows. If the song contains audio only and no associated graphics being shown on the visual display 125, then the advertisement, if it is video only, will be played simultaneously. If the advertisement contains video data and audio data, the advertisement will be run at the next available time slot or be shipped altogether. As each jukebox 13 tracks when an advertisement starts and when it stops, if a particular advertisement is never run, then the central management system will receive such information and the advertiser will be billed accordingly.

The advertisements are also stored in the storage unit 93. Because there is bilateral communication between the central management system 11 and the computer jukeboxes 13, the central management system 11 can track the number of times each advertisement is actually run for billing and royalty purposes by having this information uploaded from the computer jukebox 13 to the central management system 11. The transmission link 15 that's used to download or transmit these advertisements can be any of the means disclosed above, including, modems 17, 19, a cable system, a RF link, a satellite link, a cellular telephone link, or a portable handheld device.

The downloading and storing of advertisements is completed by the same apparatus and method as described above in connection with FIGS. 1 through 5.

In yet another embodiment, the computer jukebox 13 is associated with an electronic game, such as an electronic dart game. In the embodiment, the advertisements are also played on the visual display 125 associated with the electronic game when the game is not being played.

Additionally, it is to be understood that the embodiments of the present invention described hereinabove are merely illustrative and that other modifications and adaptations may be made without departing from the scope of the appended claims.

We claim:

1. A computer jukebox capable of receiving and storing digital data representing a plurality of advertisements, data representing the identity of each of said advertisements, and data representing when and the number of times each of said advertisements is to be run, comprising:

- a visual screen associated with said jukebox;
- a song selection means displayed on said visual screen, actuable by a user for retrieving and playing a signal representing a song selected from a plurality of songs stored in said jukebox;
- a communication interface for receiving said advertisement data, said data representing the identity of each of said advertisements, and said data representing when and the number of times each of said advertisements is to be run;
- a programmable computer memory storing said digital data representing each advertisement on said jukebox,

10

the location of said digital data representing each advertisement, and said data representing when and the number of times each of said advertisements is to be run on said visual screen; and

5 processing means for displaying one of said plurality of advertisements on said visual screen, when said jukebox is not generating a signal representing a song selected from said plurality of songs stored in said jukebox, wherein said processing means is responsive to said data representing when and the number of times each of said advertisements is to be run.

2. A computer jukebox as recited in claim 1 wherein said communication interface includes a modem.

3. A computer jukebox as recited in claim 1 wherein said communication interface includes a radio frequency receiver.

4. A computer jukebox as recited in claim 1 wherein said communication interface includes a direct interface port.

5. A computer jukebox as recited in claim 1 wherein said communication interface includes portable infra red device.

6. A computer jukebox as recited in claim 1 wherein said communication interface includes a satellite receiver.

7. A computer jukebox as recited in claim 1 wherein said communication interface includes a cellular telephone receiver.

8. A jukebox network comprising: a plurality of computer jukeboxes, each jukebox including a programmable computer memory storing digital data representing a plurality of advertisements and data representing the identity of each of said advertisements, and data representing when and the number of times each of said advertisements is to be run;

a visual display;

a communication interface for receiving and transmitting digital data including digital advertisement data;

35 processing means for controlling the display of advertisement data on said visual display and to store advertisement display data in said memory, said processing means being responsive to the receipt of digital advertisement data representative of the number of times each of said advertisements is to be run and when each advertisement is to be run by said communication interface;

a management station for updating said plurality of jukeboxes, said management station including a communication interface for receiving and transmitting data and a host processing means for controlling the transmission of digital advertisement data to a computer jukebox to update the jukebox, said management station being operative for selectively transmitting digital advertisement data to different ones of said jukeboxes.

9. A jukebox network as recited in claim 8 wherein said management station is remote from said plurality of jukeboxes and the communication interface of said management station and each jukebox provides a two way communication link between said remote management station and said jukebox.

10. A jukebox network as recited in claim 8 wherein said management station is portable.

11. A jukebox network as recited in claim 10 wherein said communication interface of said management station provides a direct communication between said station and said jukebox.

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